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INDEX NUMBER

VOLUME XCVI, NUMBER 759 JUNE 1940

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"CORN STATES"

— AND —

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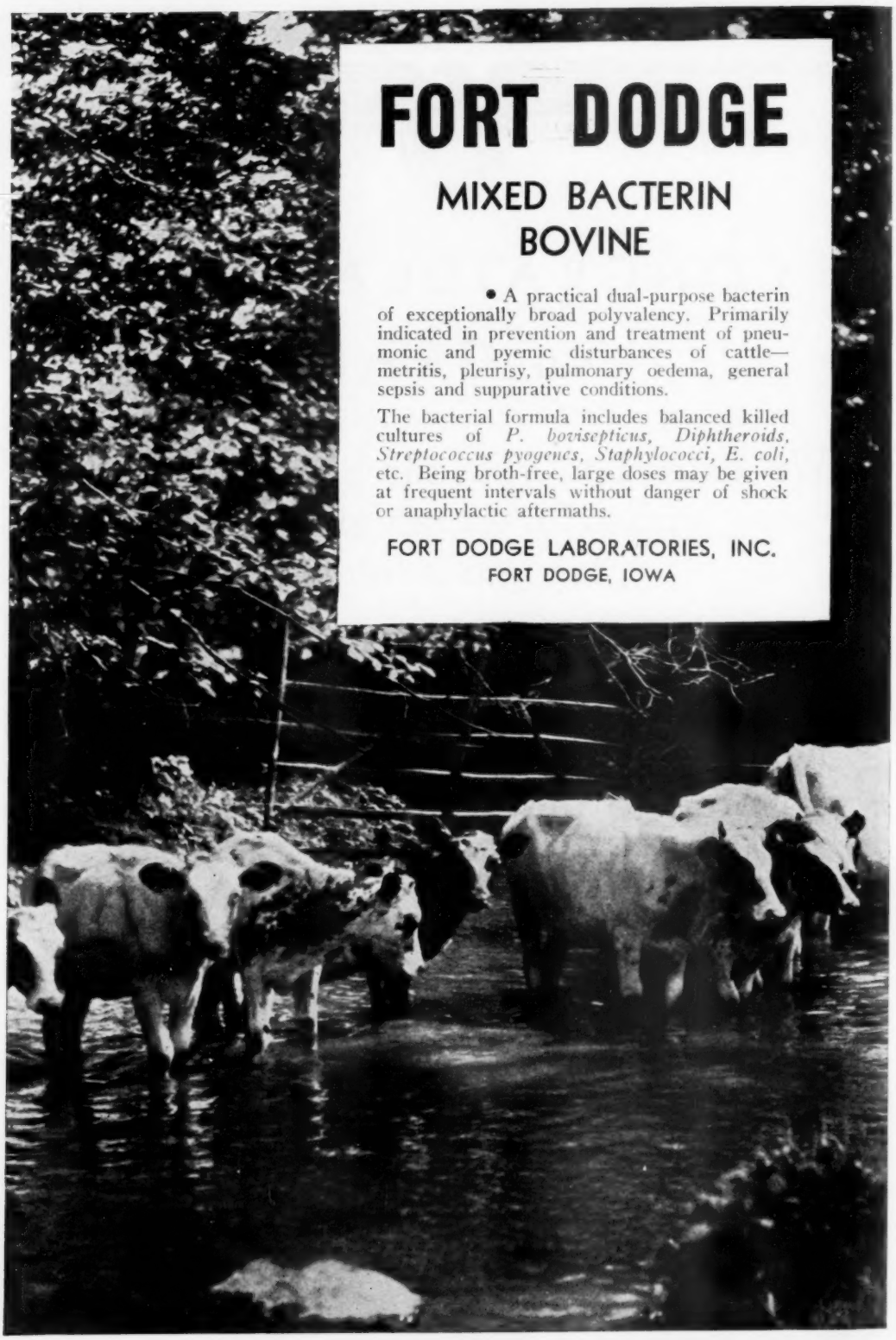
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Journal
of the
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VOL. XCVI JUNE 1940 NO. 759

Cattle Practice*

By W. C. McCONNELL, D.V.M.
Holdenville, Okla.

SHIPPING FEVER

Many stock cattle of all ages develop shipping fever in transit or immediately after reaching their destination. The losses are greater in early winter when weather conditions are bad, and during a time that large numbers of cattle are shipped.

Pasteurella boviseptica, diphtheroid streptococci, *Escherichia coli* and staphylococci are the most important bacterial factors associated with the disease.

Symptoms.—Coughing, lacrimal and nasal discharges, anorexia and general unthriftiness are commonly observed. Other characteristic symptoms are dropping of the ears, congestion or a hemorrhagic condition of the mucous membranes, rapid pulse, rapid breathing, expiratory grunting, rales, soreness on percussion and, possibly, areas of dullness. There may be diarrhea, although this is observed but rarely. All affected animals exhibit a temperature of 103.5° to 107° F.

Postmortem Lesions.—Those usually found are croupous or fibrinous pneumonia and pleuritis, generally with pleuritic adhesions and enteritis. On section the pneumonic areas ordinarily are separated by marked edematous thickening of the interlobular septa, thus giving the lungs a striking marbled appearance. In chronic cases necrotic areas and abscesses are found. The bronchi are congested and hemorrhagic and contain exudate. The body cavities often contain quantities of reddish or yellowish fluid. In the septicemic type the lesions may be slight or extensive; this includes hemorrhages in the subcutis and intermuscular tissue, on the peritoneum and pleura, swelling and hemorrhage of the lymph glands and hemorrhagic gastroenteritis.

Treatment.—If practicable, temperatures should be taken three times daily and, when possible, the well animals should be segregated from the sick. Medicinal treatment has produced varying results. The use of hydrochloric acid solution in 150- to 250-cc. amounts intravenously is recommended. Daily doses of 12.5 to 18.7 Gm. (200 to 300 gr.) of sulfanilamide have given good results. Calcium gluconate with dextrose is helpful for weak animals. In cases complicated with bronchopneumonia gratifying results have been obtained by administering neoprontosil intravenously and intramuscularly in doses of 60 to 150 cc. daily. Mixed bacterin in 15- to 20-cc. doses is sometimes administered with satisfactory results. However, there is danger in administering bacterins or vaccines during or shortly after transportation, as this may lead to the

*Presented at the 36th annual meeting of the Kansas Veterinary Medical Association, Topeka, Kan., January 17-18, 1940.

development of the disease in a more severe form during the negative phase.

Bacterins or aggressins should be administered at least ten to 14 days before cattle are shipped, in order to obtain the best results. Pneumonia mixed bacterin is usually to be preferred and should be prepared entirely with bovine strains of the organisms.

It has been demonstrated that aggressins afford greater protection than bacterins.

For purebred and other valuable cattle that are to be shipped, immediate protection may be obtained by the use of 50 cc. of anti-hemorrhagic septicemia serum before shipment, and 30 to 50 cc. upon arrival at the destination is recommended.

Other preventive measures should include proper care and hygiene during transit, as well as disinfection of railroad cars, trucks and pens.

A careful study of the handling facilities and feeding conditions show that proper shelter, placing the cattle on reduced rations and allowing access to plenty of fresh water after shipment will minimize the losses. On the other hand, when recently shipped cattle are placed immediately on full feed, their susceptibility is increased and the losses are much greater.

PARTURIENT PARESIS

Parturient paresis is a neurosis affecting particularly the milk cow. It develops usually as a sequel to parturition and is associated with tetany and general paralytic symptoms leading to coma.

A sudden drop of the blood calcium is thought to be the cause. Since the parathyroid glands apparently control calcium metabolism, attempts have been made to link milk fever with disturbed function of these glands.

In the majority of cases the disease occurs within 48 hours after parturition, although the attack may occur while the act of parturition is in progress. It may occur during the last few days of pregnancy; however, in these cases it has been observed that lactation has always commenced before the onset of the disease. Such factors as excitement, undue exertion and fatigue also play a part in the production of the disease.

Cows of 5 to 10 years of age are more commonly attacked, and it will be observed from this fact that the period of highest milk yield is the beginning of the period of greatest susceptibility to the malady. Cows that are fed generously toward the end of pregnancy and heavy milkers appear to be more susceptible. In most cases parturition, with few exceptions, is easy and uncomplicated. Frequently the non-lactation period which precedes calving has been prolonged. Another important causal factor is complete milking of the cow after parturition.

A valuable prophylactic measure is to avoid complete milking for 72 hours after calving. Milking small amounts at short intervals is recommended.

Many hypotheses have been formulated to explain the nature of parturient paresis. British workers have reached the conclusion that the immediate cause is an acute blood-calcium deficiency. Upon investigation this hypothesis was found to be correct in so far as it was proved that the blood calcium in parturient paresis is abnormally low. This finding has been confirmed by other workers.

In parturient paresis the blood calcium drops from a normal of 10 mg. per 100 cc. of blood to a minimum of 3 mg. and a maximum of 7.76 mg. The lowered calcium content of the blood is a typical feature of parturient paresis cases. The more severe the case, the lower the calcium value. The appearance of the symptoms is approximately coincident with the fall of calcium.

Tetany is a symptom in parturient paresis and the occurrence of tetany is recognized as being dependent upon a pronounced hypocalcemia and possibly a hypomagnesemia.

Mammary insufflation produces a marked rise in the blood-calcium level in parturient paresis and cures the disease. The process of recovery as manifested by the disappearance of the symptoms corresponds to the rise of blood calcium.

Exclusive of any other treatment, the

parenteral injection of calcium raises the blood-calcium concentration and cures the disease. It has been stated that one-half gallon of colostral milk contains as much calcium as does the blood at any one time. This suggests that the lack of calcium in the blood in parturient paresis is not a genuine deficiency but a disturbance of calcium metabolism.

Because of the sudden and heavy loss of blood calcium in the colostrum at the onset of lactation, and of the necessity for a rapid transfer of calcium from the skeletal reserves into the blood, it is assumed that in the event of parathyroid insufficiency at the start of lactation, this can not be accomplished quickly enough. Consequently, an acute hypocalcemia develops with resultant tetany and general muscular paresis.

It has been noted that in a proportion of cases the blood phosphates also are deficient, but it is now generally believed that the fall in the blood phosphates is of secondary importance.

While it is widely accepted that the immediate cause of an attack of parturient paresis is an acute fall in the blood-calcium concentration, the factors which induce this hypocalcemia are not yet clear, and further evidence, based upon experiments, must be awaited.

Symptoms.—At first the cow is depressed and not inclined to move; this is the beginning of loss of consciousness. Occasionally there is a brief initial period of excitement, muscular twitching, hypersensitiveness, and convulsive movements of the head and limbs, which are soon replaced by the more characteristic symptoms of paralysis and depressed consciousness. The paralysis in typical cases affects the hind limbs first, which is evidenced by unsteadiness, wide straddling and stiffness in gait, reeling and muscular twitching, soon followed by recumbency, with the head resting at the side. The animal gradually passes into a coma.

The respirations are slow, deep and often labored. The temperature may be normal or subnormal and the pulse accelerated. Constipation and retention of the urine are common. In recumbent cases tympanites is frequently present. When the coma is advanced and the body flat on the ground, food may be regurgitated and then inhaled, causing mechanical pneumonia.

Treatment.—The efficiency of calcium gluconate therapy is well established and the accepted procedure is to administer 250 cc. [usually a 23 per cent solution] subcutaneously or intramuscularly to retard absorption, and 250 cc. intravenously.

Atypical cases of parturient paresis which fail to respond to calcium therapy are probably complicated by a low magnesium level of the blood and should be treated as such. Here, the subcutaneous injection of a 20 per cent solution of magnesium sulfate is indicated.

Fortunately, the symptoms presented by hypomagnesemia are characteristic and easily recognized. In contrast to the paretic and comatose patients seen in hypocalcemias, the hypocalcemic case which is complicated by hypomagnesemia presents a picture of nerve irritation, tetany of the fore and hind legs, hyperesthesia and, in extreme cases, convulsions. Whenever these symptoms of nerve hyperirritability are encountered, the use of magnesium sulfate therapy, as an adjunct to calcium therapy, udder inflation or other therapeutic measures, is indicated. In cases which do not respond to calcium therapy and do not show the symptoms of a complicating hypomagnesemia, a urinalysis should be made for the presence of ketones.

POST-PARTURIENT KETOSIS

Post-parturient ketosis is a rather common disease of milk cows, neither infectious nor contagious, that usually occurs within six weeks after calving and is characterized by peculiar nervous symptoms, digestive disturbances, rapid loss of flesh, decreased milk flow, marked hypoglycemia, acetonuria and acetonemia. Experimental and clinical evidence points clearly to a disturbance of the carbohydrate and fat metabolism as a direct cause of the disorder. The metabolism of carbohydrates is reduced to such an extent that oxidation of fats can not be carried beyond the stage of aceto-acetic and β-hydroxybutyric acid. The ketone

bodies (acetone, aceto-acetic acid, β-hydroxybutyric acid) may be considered intermediate products of fat metabolism and are formed chiefly in the liver. If there is not enough carbohydrate or carbohydrate-forming material in the ration or if there is not enough carbohydrate stored in the body to burn up these bodies, ketosis develops. Fats burn in the fires of carbohydrates, and when the latter are deficient, the body smokes with unburned fats. These ketone bodies produce a state of acidosis.

The disease is about as prevalent in the southern states as milk fever is in the northern states.

Symptoms.—The symptoms are so variable that none is specific enough to be relied upon entirely. In practically all cases the milk flow is decreased, there is gradual loss of appetite, slowing of rumination and rapid loss of condition. The latter is so pronounced that a fat cow may become thin within a few days. Constipation is a frequent symptom, with the feces often dry and hard and frequently covered with mucus. In some cases the symptoms are primarily of a nervous type, which may be prominent. The cow may go through the motion of grazing or eating without the usual fixed purpose of prehending food, or she may lick at her calf, the wall of the barn or any other accessible object, or even her own shoulder. In some cows the back is arched or it may be swayed or turned sidewise, and the animal may walk stiffly, as if hobbled. In cases showing digestive disturbances, one can detect the odor of acetone in the breath or milk. Loss of appetite, rapid decrease in milk flow, rapid breathing and loss of condition as the disease advances are commonly observed. Dry feces are produced, the back may be arched, the head down and the eyes dull and glaring, and the flank becomes tucked up. Some animals are reluctant to move and are wabbly behind.

The course of this type of the disease is slow, lasting weeks or months. Ketosis may be confused with milk fever, traumatic gastritis, indigestion and, possibly, rabies. It is frequently associated with milk fever, less often with metritis and rarely with traumatic gastritis, hemorrhagic septicemia and acute indigestion. When states of collapse are remote from parturition, experience has shown that ketosis is often the trouble.

When a cow loses flesh and finally goes down, ketosis should first be excluded in the examination. This can be accomplished readily by testing the urine for ketone bodies. Stroking the escutcheon will usually induce urination and is a convenient way to obtain a sample for urinalysis.

Pathological amounts of ketones in the urine or, in advanced cases, in the milk can be detected with a simple colorimetric test.

The Ross modification of the Rothera test for ketone bodies is extremely helpful and can be used as a field test by the busy practitioner. The reagents consist of a mixture of one part of finely powdered sodium nitroprusside and 100 parts of pure ammonium sulfate and a separate solution of concentrated ammonium hydroxide. One gram (15 gr.) of the nitroprusside-sulfate mixture is dissolved in 5 cc. of the suspected urine, 2 cc. of ammonium hydroxide is then added and the mixture shaken. The permanganate color is pronounced in moderate acetonuria and becomes even more noticeable as the concentration of ketone bodies increases.

The urine of normal milk cows contains a small amount of acetone. The urine in acetonemia shows an enormous increase from the normal of 7 mg. per 100 cc. of urine to as high as 1,250 mg., or an increase of 170 times the normal. The blood shows a corresponding increase from the normal of approximately 3 mg. per 100 cc.

Between these two extremes are varying degrees of indigestion acetone that is probably playing more havoc in milk production than has generally been realized. Benign hyperketosis causes milk suppression and loss of weight, when the nature of the trouble is not even suspected.

Since the disease has become recognized, its economic importance from the standpoint of loss in flesh, milk production, and the production of off-flavored milk is apparent. In the light of recent investiga-

tions concerning the variety of hydrolytic cleavage products produced by the bacterial and enzymic fermentation of cellulose materials, it is suggested that these intermediate products may play an important rôle in ruminant digestion and, particularly, in the study of the physiology of ketosis. The general conclusion is that certain practical measures can be taken to reduce the incidence of ketosis in farm herds under stall-feeding conditions. The most important of these are an improvement in the general management of the herd and better feeding, especially in regard to roughages. The results also suggest that high-producing cows on ordinary roughage rations may demand additional quickly soluble sugars to satisfy their demand for endogenous carbohydrate metabolism.

Making ketosis determinations in dairy herds falling below expectations in milk production, or in those producing off-flavored milk or losing in flesh, or in herds where a combination of these conditions exists, is a procedure that the dairy clinician can follow to advantage.

Treatment.—For many practitioners dextrose therapy is the treatment of choice. It is used because it provides carbohydrates for the further combustion of the ketone bodies. With respect to both the amount injected at one time and the strength of the solution, there is a considerable margin of safety. The main objection to this line of treatment seems to be that a number of intravenous and subcutaneous injections are usually required to effect a cure, which makes the treatment rather expensive.

In my practice chloral hydrate treatment, made popular by J. T. Alston of Tupelo, Miss., has proved to be the most practical, and it is a near specific for ketosis. It consists of giving approximately 90 Gm. (3 oz.) of chloral hydrate in the course of 36 hours, 24 Gm. (0.8 oz.) being the average dose. In cases exhibiting prominent digestive disturbances and in more severe cases, additional doses may be required to secure permanent recovery. Another advantage of the chloral treatment is that the owner may administer the follow-up treatment himself. Following chloral hydrate or glucose therapy, sorghum, syrup, sugar or crude dextrose should be fed and feeding errors corrected.

Chloral hydrate therapy serves as a spe-

Visit the National Capital in August

One of the most awe-inspiring sights in America is the Lincoln Memorial in Washington, D. C.

cific treatment in at least two ways: By its influence upon the nervous system and through its ability to increase the true blood sugar in the course of 24 hours, as shown by blood-sugar reading.

Where the calcium and sugar content of the blood is low, calcium gluconate and dextrose are indicated.

The licking-mania type of ketosis usually responds at once to the subcutaneous injection of 200 to 250 cc. of magnesium sulfate solution (20 to 25 per cent solution) when combined with the usual chloral hydrate or glucose therapy. One investigator has used insulin with good results.

Tonics, stimulants and sodium bicarbonate have been used, the latter being administered intravenously (500 cc. of a 6 per cent solution) to overcome acidosis, but it does not affect the metabolism of the ketone bodies.

Diseases of the Fore Stomachs

When the immense volume and complicated arrangement of the gastric compartments of the cow are considered together with the great quantities of aliment required in the elaboration of milk, development of the fetus, and for the animal's own nutrition, it is small wonder, in view of the carelessness so often apparent as to both the kind and quality of food, that diseases of the digestive organs in these animals are of more frequent occurrence than any other disease. Most of the bovine digestive disturbances involve the rumen and reticulum.

Diseases of the fore stomachs associated with tissue changes seldom occur, owing to the remarkable development of the stratum corneum of the epithelium and the absence of glands. Practically all disturbances in the organs consist of functional aberrations of their motor activities, which affect the softening, mixing, cleavage and fermentation of food material.

The rumen is capable of holding 20 to 40 gal. of food, which constitutes about 80 per cent of the bovine gastric volume. Being on the left side the rumen is easily palpated through the left flank and also per rectum. Its mucosa does not secrete digestive fluids. Just anterior to the rumen is the reticulum, which represents about 5 per cent of the total gastric capacity. No digestive fluids are secreted by its honeycomb-like mucosa. The cavity of the rumen communicates freely with that of the reticulum, so that a disturbance in one usually involves the other.

IMPACTION OF THE RUMEN

In impaction of the rumen one finds an overfilling or distention of the rumen by an excessive amount of dry or hard ingesta without undue gas formation. At first, the gastric contractions are intensified, then diminished, or they may be abolished completely. Among the causes of impaction may be mentioned the ingestion of unusually large quantities of fodder when the animals previously were given more succulent foods, and cases where cows break loose and feed greedily until the rumen is overloaded. A few of the predisposing causes are the ingestion of cold water, over-exertion directly after feeding, general debility, and sudden change from green to dry fodder, especially if a sufficient supply of water is not provided.

Symptoms.—The animal exhibits a general malaise, placing the feet under the abdomen, arching the back and staring fixedly. In some instances colicky pains appear, causing the patient to switch its tail, kick its hind feet against the abdomen, turn its head toward the sides, and lie down and get up frequently, often groaning while doing so. Usually the animal does not lie down much, and if it does, it is in most cases on the right side. The left flank is distended and in some the whole abdomen is enlarged. On palpation the content of the rumen feels doughy or hard. The patient usually is constipated and milk secretion falls off, but the temperature is normal. As a rule the prognosis is good.

Treatment.—The treatment should be directed to promoting the movements of the rumen by the administration of one fourth to one sixth of the full dose of rumen-stimulating drugs, and repeating as

required. In this way the rhythmic movement of the fore stomachs and the propulsion of their contents can be more effectively promoted. Parasympathetic stimulants—such as eserine, 0.5 to .75 gr., or arecoline, 0.6 to .12 gr.—administered subcutaneously, are suitable for this purpose. Among other drugs administered by the mouth may be mentioned tartar emetic, 6 to 10 Gm. (96 to 160 gr.) dissolved in liberal quantities of water. Barium chloride, 6 to 10 Gm., is less suitable.

Drastic purgatives are contraindicated as they cause severe abdominal pain and thus impede the passage of ingesta.

Fasting the patient one or two days and the introduction of large quantities of water (7 to 10 gal.) into the rumen have been found effective, even in severe cases. This should be followed by kneading the walls of the abdomen over the rumen several times daily. Gastric lavage is effective in many cases and consists of introducing a large 1- or 2-in. inside-diameter heavy stiff curved hose into the rumen, through which a smaller hose is passed. Then, several gallons of water is introduced, the rumen kneaded through the abdominal wall and the liquefied contents siphoned out. This should be repeated as indicated.

Additional drug therapy includes the use of ammonium carbonate, oil of turpentine, bitter tonics, stimulants or hydrochloric acid, 4 dr. in 1 gal. of water, to which 2 dr. of pepsin may be added to arrest gastric fermentation and act as a tonic.

Impending suffocation may be relieved by trocaring the rumen or, in severe cases, by rumenotomy, with removal of a portion of the contents. It is advisable to search for foreign bodies in the reticulum.

During convalescence the patient should be placed on a restricted diet for a few days and fed only succulent feeds.

ACUTE FLATULENCE

Acute flatulence is a rapid distention of the abdomen, due to gas that is formed from the fermenting contents of the rumen and reticulum. The foodstuffs most commonly concerned are leguminous plants, especially before they have flowered, and when they are particularly succulent. They are even more dangerous when wet with rain or dew. Many other foods which ferment easily, may be incriminated. These include potatoes, beets and withered heat grass. Certain toxic plants also may cause bloating. The richer and more succulent the food, the more likely it is to cause flatulence, and the danger is increased if the animals drink directly after pasturing or feeding.

Symptoms.—The most prominent symptoms are rapid distention of the abdomen, especially on the left side, with tenseness of the abdominal wall. On percussion a hyperresonant tone is emitted. On auscultation no peristalsis is audible. The patient is usually quite dyspneic and breathes with the mouth open and the tongue protruding.

Dougherty,[1] in his physiological studies of induced and natural bloat in dairy cattle, found that:

> Gas absorption from the rumen is quite rapid; the greater the amount of rumenal mucosa exposed, the faster the rate of absorption. Carbon dioxide is absorbed from the rumen and produces marked symptoms upon the respiratory apparatus, relatively high pressures causing extreme dyspnea. An increase in intrarumenal pressure causes an increase in the rate of absorption of carbon dioxide and carbon monoxide from the rumen.
>
> Carbon monoxide, when present in the rumen in a very low concentration, will cause marked symptoms when the intrarumenal pressure is increased with other gases common to the rumen. The intrarumenal pressure in this case need not be extreme.
>
> Carbon monoxide was found in an appreciable amount in two experimental cows fed freshly cut ladino clover.

Regurgitation of food masses occurs occasionally. The mucous membranes become cynotic, there is restlessness, loss of appetite, suppressed rumination and eructation of gas through the esophagus. Acute bloating is always serious, but if treatment is promptly and properly administered, recovery usually follows.

Of the palliative measures, the most reliable and simplest method of evacuating the gases from the rumen is to massage both flanks gently with the knee or hands

while the fore quarters are elevated. Placing a large bit or gag in the mouth facilitates the escape of gas, as does irritating the throat with a blunt instrument inserted through the mouth while the tongue is drawn forward. In some cases gastric lavage is effective when employed as recommended for impaction of the rumen.

Bloating in ruminants is not the result of the fermentation of either nitrogenous or fatty material, which is always slow and characteristically fetid. Obviously, bloat is caused by the fermentation of cellulose ($C_6 H_{10} O_5$). The molecule decomposes into two gases, carbon dioxide and methane, in equal parts. This being true, the rational medicinal treatment is ammonia, which forms ammonium carbonate in the presence of the carbon dioxide and, in addition, asserts a beneficial akalinity. A 2 or 3 per cent saline solution, given *via* the stomach tube, is perhaps equally valuable. In suitable cases, parasympathetic drugs are indicated. Equal parts of aromatic spirits of ammonia and oil of turpentine in 120- to 240-cc. (4- to 8-oz.) doses have given good results.

Various other drugs have been used; however, all drugs play only a subordinate part in the treatment of acute bloating. The effect is largely due to belching, which the act of drenching induces. Radical measures are indicated when the life of the patient is threatened by severe dyspnea or when palliative measures are not advisable or have proved insufficient, in which case trocaring the rumen is often life-saving. When a heavy fermentable mass, such as alfalfa or green corn, is present, ordinary measures often are too slow and the veterinarian is obliged to resort to rumenotomy, with the removal of the contents of the rumen through the flank. After the bloating is relieved, the animal should be placed on a strict diet with moderate doses of aperients or drugs which stimulate the movements of the rumen.

CHRONIC FLATULENCE

Chronic flatulence is not a disease *per se*, but it represents a group of symptoms which may occur in the course of various affections of the esophagus, stomach or bowels, and which interfere with belching. It is therefore secondary. The causes may be compression of the esophagus from tuberculous mediastinal lymph glands, stenosis of the esophagus, atony of the fore stomachs, adhesions from traumatic gastritis, hair balls, and stenosis or impaction of the intestine.

Symptoms.—Usually there is gradually increasing and moderate distention of the left flank, which is often intermittent and follows the ingestion of food which ferments easily. Later, it may occur after each feeding and, in some cases, the distention may be permanent. The general condition is usually not disturbed to any extent, as the patient may continue to eat, ruminate and appear to be in normal health, except for the distention. In other cases the distention may become quite marked, with suppressed or entirely suspended rumination.

Treatment.—This is practically the same as that suggested for acute flatulence to relieve bloating. After the symptoms have subsided, the administration of saline aperients should be continued for a time, in smaller doses. Careful attention should be given to the diet. Chronic bloaters, especially feeder calves, should be sent to market early, as there is no successful treatment.

ATONY OF THE FORE STOMACHS

Atony of the fore stomachs is a gradually developing reduction of the power of contraction of these organs which results in retardation of the evacuation of food material and consequent disturbed digestion. It is usually the result of improper feeding and care. Atony may be primary or secondary. In primary cases the food and feeding practices are the most potent causes. In secondary cases the causes may be bad teeth, actinomycosis of the tongue, traumatic gastritis, pregnancy, chronic peritonitis which leads to adhesions, gastric tumors, liver disease, tuberculosis and chronic heart and lung diseases.

Symptoms.—In the acute form the symptoms comprise thirst and diminished appe-

tite, and slow and infrequent rumination. The animal chews its cud at rare intervals and with little vigor. The movements of the rumen are feeble but may occur with normal frequency. If the patient does not receive corrective treatment, the affection is liable to continue as a chronic form. The chronic form usually develops gradually. The appetite slowly diminishes but is not entirely lost; in some cases it is capricious and the patient may prefer roughage to concentrates. The animal usually drinks little water, although in some cases increased thirst is shown. Rumination is suppressed. The flank is intermittently distended with gas and increases after eating, which is a rather characteristic symptom. On palpation the food in the rumen feels firm and retains finger prints longer than in health. Colicky pains occasionally occur and are manifested by switching of the tail and kicking against the abdomen with the hind feet.

The bowels are generally constipated. The feces are black, hard and dry; sometimes they are covered with blood-stained mucus and passed in the form of balls. A fetid diarrhea develops in prolonged cases, and this may alternate with constipation. Milk secretion is diminished from the beginning. The temperature and pulse are at first but little affected. Respiration is sometimes accompanied by groaning and is often accelerated. When atony persists for several days, the patient may become distressed and stand with all four feet drawn together and the back arched. The animal frequently grinds the teeth, the muzzle is dry and the eyes retracted. Due to weakness from lack of food, the patient lies down a great deal in the later stages and can be brought to its feet only with difficulty. Such cases present symptoms resembling parturient paresis.

The pulse becomes rapid and weak in the later stages and the temperature is rarely over 104.5° F. If bloating or marked impaction of the rumen is present, dyspnea exists. In prolonged cases the patients generally become anemic, emaciated and even cachectic, and eventually die of inanition.

Treatment.—The treatment consists of withholding or restricting food for a few days in acute cases. Kneading the rumen for a few minutes several times a day is beneficial. Salt and plenty of water should be accessible. Turning the animal out to grass is advisable in light attacks. Medicinal treatment is indicated as in impaction, and includes parasympathetic stimulants, sodium bicarbonate and hydrochloric acid (1 dr. in 1 qt. of water) several times daily to stimulate the appetite and to arrest fermentation. In obstinate cases the administration of large quantities of water through a stomach tube or trocar is recommended. To the water may be added hydrochloric acid or other indicated drugs. Occasionally, obstinate cases are relieved by rumenotomy. In cases of primary atony, especially following parturition, the parenteral injection of calcium gluconate, or calcium gluconate and dextrose, is of material benefit.

TRAUMATIC GASTRITIS

Another disease of the fore stomachs that is occasionally encountered is traumatic gastritis. This condition includes disturbances in digestion due to peritonitis caused by pointed foreign bodies, and digestive troubles due to motor disturbance or obstruction of the different sections of the stomach, caused by blunt foreign bodies.

It has been reported that traumatic gastritis may be diagnosed with certainty if the heart beat is 100 or more and if there is loss of appetite and no temperature.

Reference

[1]Dougherty, W. H.: Physiological studies of induced and natural bloat in dairy cattle. Jour. AVMA, xcvi (Jan. 1940), pp. 43-46.

Starlings

Starlings have become a pest. "Severe damage to cattle in Kansas," says *Successful Farming*, "is reported to be caused by these birds, which are new in the Midwest." They light upon the backs of cattle to feed upon partly extruded warbles and, in doing so, tear out patches of hide. They also attack brands and cause stampedes.

Efficacy of Nonconditioned Phenothiazine in Removing Worms from the Alimentary Canal of Cattle*

By LEONARD E. SWANSON,† D.V.M., DALE A. PORTER,‡ Sc.D., and JAMES W. CONNELLY†

THE POSSIBILITIES of phenothiazine as an anthelmintic were first demonstrated by the action of this chemical in removing nodular worms and ascarids from swine.[1,2] Later Harwood, Habermann and Jerstad,[3] Swales,[4] Gordon and Whitten,[5] Gordon,[6,7] and Roberts[8] reported promising results with phenothiazine as an anthelmintic for the removal of worms from sheep, particularly stomach worms and nodular worms.

Since the economically important gastrointestinal parasites of cattle are closely related to, and in the case of the stomach worm, *Haemonchus contortus*, specifically identical with those occurring in sheep, it appeared desirable that tests with phenothiazine be made in cattle. The data obtained in these tests, conducted at the laboratory of the zoölogical division, Moultrie, Ga., are presented in this paper.

MATERIALS AND METHODS

The phenothiazine, or thiodiphenylamine, used in these experiments was the nonconditioned product (without a wetting agent) obtained from a commercial company. In this state, phenothiazine is a bulky, light-green powder (when fresh) that becomes darker when exposed to light and air.

The calves used in the tests were pasture animals, purchased in southern Georgia. They were obtained from herds where losses due to parasitic gastroenteritis had occurred and, for the most part, the host animals were in poor condition. The most commonly noted symptoms, possibly caused by parasitism, were emaciation, weakness, dejected appearance, rough hair coat, and diarrhea. In some instances an edematous swelling under the jaw (bottle jaw) was observed.

The calves were fasted for 24 hours before treatment; the drug, in doses of 50 to 80 Gm. (1.6 to 2.6 oz.), was placed in 1-oz. gelatin capsules lubricated with mineral oil and administered with a balling gun. As a 1-oz. capsule holds approximately 11 Gm. of the drug, the number given each calf depended upon the size of the dose. After treatment the calves were put on their regular feed and confined in small concrete-floored pens. The diet consisted of peanut hay or Johnson grass hay with a supplement of shelled corn, chopped oats and alfalfa meal; the last-named constituent was not eaten as readily as the other constituents of the diet.

The total feces passed in each 24-hour period following treatment were collected and thoroughly mixed. The feces were then weighed and ten samples of 10 Gm. (2.6 dr.) each were weighed out from different parts of the fecal mixture. After each sample was washed on a 100-mesh screen, the worms in the coarse material retained by the screen were counted and identified. The total number of small nematodes passed was estimated from the average number in a 10-Gm. sample of the daily fecal output. The feces remaining after sampling were screened to determine the number of hookworms and nodular worms passed. Except where noted, the last-named procedure was used to determine the number of *H. contortus* passed.

Six to eight days after treatment, when it was certain that elimination of the worms had ceased, the calves were killed and examined for parasites. The fourth stomach and small intestine were tied off and opened separately in warm water, and the mucosa was thoroughly scraped to remove possible adhering worms. The contents and scrapings of the stomach were diluted to 1,500 cc. (3.2 pt.) and those from the small intestine were diluted to 3,000 cc.

*From the Zoölogical Division, Bureau of Animal Industry, U. S. Department of Agriculture.
†Zoölogical laboratory, Moultrie, Ga.
‡Animal Disease Research Laboratory, Auburn, Ala.

TABLE I—Nematodes eliminated in the feces of calves following treatment with nonconditioned phenothiazine.

Host Animal*		Treatment		Worms Eliminated					
Number	Weight (Kg.)	Dose (Gm.)	Date (1939)	H. Contortus†	O. Ostertagi	T. Axei	B. Phlebotomum	Cooperia Spp.	O. Radiatum
2	70.5	50	10–29	2	0	0	7	229	581
3	68.2	50	11–1	6	0	0	39	222	96
5	75.0	80	11–7	321‡	0	25	220	1,871	131
7	66.4	50	11–25	2	317	263	683	321	1,494
8	131.9	60	11–27	85	1,022	1,969	178§	0	1
11	91.0	50	12–2	97‡	232	2,116	33‖	1,270	228

*All males except No. 11.
†*H. similis* found but counted as *H. contortus*.
‡Specimens of *H. contortus* badly broken and disintegrated; therefore, the number passed was estimated by counting the number of *H. contortus* tails found in ten 10-Gm. samples taken from the entire collection.
§Includes five worms dead in large intestine considered as removed by the drug.
‖Includes three worms dead in large intestine considered as removed by the drug.

(3.2 qt.). While the mixture was being stirred to obtain an even suspension of parasites in the fluid, ten samples, 15 cc. in volume, were taken from each mixture. The total number of worms of each species of small nematodes present was then estimated from the average number in the 15-cc. samples. The numbers of adult stomach worms (*H. contortus*), hookworms, and tapeworms were determined by screening the entire contents of the stomach and small intestine. Nodular worms and whipworms also were counted by screening the contents of the large intestine.

In herbivorous animals which possess long intestinal tracts, it is possible that small species of nematodes located in or near the duodenum may be completely digested after being killed by an anthelmintic, this taking place before the worms are eliminated in the feces. To obtain information on this point, as well as to obtain a basis for determining whether or not the pathological conditions observed in treated host animals at necropsy were due to the treatment or to preëxisting causes, a number of control calves from the same pastures as the treated calves were examined at necropsy for parasitic worms. In the case of calf 5, no pasture mate was obtained.

Experimental Results

The results obtained by the administration of nonconditioned phenothiazine to six calves are summarized in tables I and II. Doses of 50 to 80 Gm. (approximately .44 to 1.1 Gm. per kilogram of body weight) were 100 per cent effective against *H. contortus* and *Trichostrongylus axei*, as well as 79.8 to 96.6 per cent effective against *Ostertagia ostertagi*, 97.9 to 100 per cent effective against *Oesophagostomum radiatum* and from 23.7 to 100 per cent effective against *Bunostomum phlebotomum;* the lowest efficacies against the latter occurred in the heavier calves (Nos. 8 and 11), in which the dose rate was the lowest, namely, approximately .44 to .55 Gm. of phenothiazine per kilogram of body weight. A single male *H. similis* was found in the feces of calf 3.

Of 33 Trichuris sp. found in four calves, only two were recovered from the feces following treatment. The chemical was wholly ineffective against Strongyloides in calves 3 and 7 and against Moniezia sp. in calves 2, 3 and 7.

The data indicate that nonconditioned phenothiazine is not more effective against Cooperia spp. than the recrystallized product tested against members of this genus in sheep (Habermann and Harwood[9]). Excluding 502 specimens which were not identifiable as to species, it is interesting to note that the treatment was apparently more effective against *Cooperia pectinata* than *C. punctata*. The efficacy ranged from 4.8 to 32.4 per cent in the former as against 0.9 to 9.5 per cent in the latter, without any particular relation to the dose rate. A total of over 5,000 fourth- and fifth-stage

TABLE II—Nematodes found at necropsy of calves treated with phenothiazine and the percentage of efficacy of the treatment.

Host Number	Date (1939)	Necropsy: Worms Found: H. Contortus	O. Ostertagi	T. Axei	B. Phlebotomum	Cooperia Spp.	O. Radiatum
2	11–6	0	0	0	0	12,580	0
3	11–9	0	0	0	18	6,320	2
5	11–15	0	0	0	0	19,256	0
7	12–2	0*	11	0	2‡	4,160	0
8	12–4	0	260†	0	443	0	0
11	12–8	0	30	0	106	10,140	1
		Percentage of Efficacy					
2	11–6	100	—	—	100	1.0	100.0
3	11–9	100	—	—	68.4	3.4	97.9
5	11–15	100	—	100	100	8.8	100.0
7	12–2	100	96.6	100	99.7	7.2	100.0
8	12–4	100	79.8	100	28.7	—	100.0
11	12–8	100	88.5	100	23.7	11.1	99.5

*Fourteen larvae of *H. contortus* found in stomach of calf 7, but not considered in the percentage of efficacy.

†One hundred and eighty larvae of *O. ostertagi* found in stomach of calf 8, but not considered in the percentage of efficacy.

‡Immature fifth stage.

larvae of Cooperia was found at necropsy of the treated calves harboring adults of this genus. Here, as in calves 7 and 8, where similar stages of Haemonchus and Ostertagia were recovered at necropsy, the larvae were not considered in determining the efficacy of treatment. The apparent ineffectiveness of the treatment against the immature stages, particularly those of the stomach worms, might in practice necessitate redosing at a later time, when such forms had reached maturity.

The untreated pasture mates were found to harbor the same species of parasites as the tested calves. However, the degree of infestation was so variable that no comparative information of value as regards the number of specimens of helminths present could be obtained.

Unfavorable reactions which could be attributed to the action of the drug were relatively slight. All calves lost weight while on experiment, but as similar loss of weight was observed in the control animals, it is believed that the decline was due to the factors involved in the transportation of the calves from the field to the laboratory, and not to the treatment. The urine eliminated by all treated animals became red on exposure to air. Similar discoloration of the urine following treatment has been observed in sheep by various investigators[3, 4, 7] and in laboratory animals by De Eds, Eddy, and Thomas,[10] who reported that the red color is due to thionol. For one day following treatment all calves ate sparingly, but with the exception of calf 5 all recovered promptly. Likewise, calf 5 suffered from a severe diarrhea during the test, while the feces of the other experimental animals became firm and relatively dry after treatment. After treatment calf 5 refused all food except cracked corn and, consequently, it was weak when the experiment was terminated.

The most severe lesions observed at necropsy were present in calf 5, which showed tuberculosis of the mesenteric lymph glands, and a severe hemorrhagic enteritis of the large intestine. In calf 7 the mucosa of the abomasum was gelatinous, a condition

which was seen occasionally in untreated animals.

DISCUSSION

The tests described in this paper indicate that phenothiazine should be of considerable value as an anthelmintic for cattle. In calves such as those involved in these tests, suffering from a weakened condition due to parasitism, the chemical was relatively nontoxic and at the same time effective against injurious parasites. The treatment appears particularly promising in view of its effectiveness against the stomach worms and nodular worms, pathogenic nematodes of considerable importance in calves. No satisfactory treatment for the latter parasites was known heretofore.

Phenothiazine in its present crude form is too light and bulky for practical administration in capsules, particularly to calves weighing over 91 kg. (200 lb.). For this reason further work on the size of dose and dosage methods is now in progress.

SUMMARY

1) Unconditioned phenothiazine removed 100 per cent of mature *Haemonchus contortus* and *Trichostrongylus axei* as well as 99.8 per cent of *Oesophagostomum radiatum* from calves when the drug was administered in doses varying from 50 to 80 Gm. (.44 to 1.1 Gm. per kg. of body weight).

2) In limited tests unconditioned phenothiazine at a dose rate of .44 to .55 Gm. per kg. of body weight in calves weighing over 91 kg. (200 lb.) was less effective against hookworms (=*Bunostomum phlebotomum*) than when given to lighter calves at a dose rate of from .66 to 1.1 Gm. per kilogram of body weight.

3) The chemical was approximately 84 per cent effective against *Ostertagia ostertagi*, slightly effective against Cooperia spp. and ineffective against Trichuris sp., *Strongyloides papillosus* and Moniezia sp.

4) A larger percentage of *Cooperia pectinata* than of *C. punctata* was removed by the treatment.

5) Phenothiazine was found to be comparatively nontoxic for calves. This drug shows considerable promise as an anthelmintic for gastrointestinal nematodes in these host animals.

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Important Announcement

After June 1, 1940, the executive office of the Association will be located at

600 S. MICHIGAN AVE., CHICAGO

For full details see page 757 of this issue

The Presence of a Capsule on Brucella Cells*

By I. FOREST HUDDLESON, D.V.M., M.S., Ph.D.

East Lansing, Mich.

IT HAS LONG been known that individual smooth strains of Brucella often vary in their pathogenicity for experimental animals, even shortly after primary isolation. It also is known that when a culture of Brucella becomes dissociated, it no longer possesses pathogenic and little, if any, antigenic properties. Suspensions of the dissociated forms are unstable in physiological salt solution and in the presence of certain aniline dye solutions.

There exist no data pertaining to the nature of the biological or biochemical changes in the cell which might account for differences in the pathogenicity of cultures of Brucella.

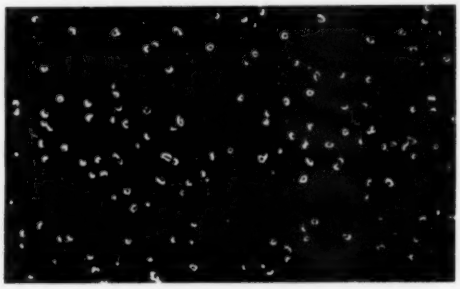

Fig. 1. Capsules on Brucella cells (x 950).

It occurred to the writer that certain forms of Brucella cells might possess a capsule. The presence and size of the capsule, if it could be demonstrated, should answer a great many questions pertaining to observed biological differences in cultures. In the attempts made to demonstrate the presence of a capsule, many of the procedures which have been described for the demonstration of capsules on other bacteria were followed. The efforts met with no success until a modification of the Burri India technic was employed.

The technic which has given the most uniform success is as follows:

A dilute suspension of Brucella cells is prepared in physiological salt solution or distilled water. A small drop of the suspension is placed near one end of a clean microscope slide, and drawn across the slide by placing the end edge of another slide at one angle in front of the drop. The film of bacteria is dried in the air. A small drop of Keuffel and Esser India drawing ink No. 3000 is placed back of the beginning of the previous smear and drawn over it with the end edge of another slide. The ink smear is allowed to dry in the air. The smear is now treated with methyl alcohol containing 0.2 per cent glacial acetic acid for five seconds and again air dried. The slide, film up, is placed on a rack and stained five minutes with aniline crystal violet[1] previously diluted 1:1 with distilled water. The excess stain is now washed off with distilled water and the smear air dried.

On examining the smear under the microscope (oil-immersion objection, 10 or 12 x ocular), it is necessary to move the slide to an area where the ink smear is not too dense in order to view the encapsulated bacteria in their normal size. The soma appears as a deep-purple coccus or rod inside the capsular material, which stains light pink or purple. If the smear is fixed for five seconds with 5 per cent acetic acid prior to staining, the capsular material does not stain but appears as a light halo around the soma or bacterial body. The size of the capsule depends upon the size of the soma. The size varies from 1.5 to 2.5μ.

The capsule appears larger in recently isolated cultures and in those that have grown on culture media for not longer than 72 hours.

Cultures that have become completely dissociated or rough do not show a capsule.

The only other staining procedure with which the writer has succeeded in demonstrating capsules on Brucella cells is that

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A Study of the Agglutination Titres of Milk Serum from Known Infectious Abortion Reactor Cows

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Doylestown, Pa., and Charlotte, N. Car.

ONE OF the writers (H.D.P.) conducted the agglutination test (tube method) in the dairy herd of a public institution consisting of 113 female cattle ranging in age from 9 months to 18 years. As there were 37 lactating reactors out of a total of 85 milking cows, or 43.52 per cent, on the initial test, it was interesting to determine to what extent *Brucella abortus* antibodies occurred in the milk from these reacting cows. Samples of milk were obtained at the time of appraisal, and the presence of agglutinins in a high percentage of them created the desire to continue this study.

As a matter of comparative interest, although not a part of this work, we found that the incidence of infectious abortion ran as high as 71.21 per cent on the first test in commercial dairy herds that were supplying a raw-milk-consuming retail trade. In small, noncommercial herds higher positive averages, reaching 100 per cent in many cases, have been obtained, but these are of only relative importance because the distribution of the milk of these herds is limited and usually utilized in the preparation of butter and/or buttermilk, or consumed as raw milk by the owner's family and neighbors.

This study was made of the milk obtained from 500 cows, representing the principal dairy breeds, that reacted to the agglutination test (tube method) under federal supervision. All were slaughtered in due course of time. These cattle came from herds ranging from a single family cow to commercial herds of more than 100 head. While no accurate record was kept of the actual number of herds, it can be estimated that the number was between 200 and 300, representing in the process of detection several thousand head. The ages varied from 2 to 18 years. The period of lactation varied from recently fresh cows (not colostrum) to strippers. Practically all of the cows were in the milking line and their production constituted a portion of the output of the particular dairy concerned.

The samples of milk were obtained at all hours of the day from these reactors in the order of their declaration over a period of seven consecutive months during 1937 to March 1938, thus equalizing the variations in agglutination due to the lapse of time (Morrison & Hull[1]). They were collected in the counties of Mecklenburg, Gaston, Lincoln, Union, Cabarrus, Rowan, and Albemarle, N. Car., and a few from Augusta County, Va. The majority originated in Mecklenburg county. The period of time between the initial test and the collection of the milk sample on only a few occasions exceeded three weeks; in most cases the time was much less.

Further to reject the lapse-of-time factor in this study, and to ascertain the effect

(*Continued from preceding page*)

employed by Churchman and Emelianoff.[2] This procedure, however, does not always give satisfactory results.

The India ink procedure just described is highly satisfactory for demonstrating capsules on other bacteria, such as the streptococci, pneumococci and spore formers.

The capsule on Brucella possesses physical and chemical properties different from those of *Diplococcus pneumoniae* in that it is not easily removed, and its size is not affected by incubation with specific serum.

Studies are now in progress in this laboratory to determine the chemical nature of the capsular substance.

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of gross exposure on the agglutinability of blood serum, we held three known positive (tube technic) blood samples at room temperature for three weeks. The samples were merely placed in a rack and set upon a shelf in the laboratory. The blood coagulated, hemolysis occurred, and some mould growth developed. The serum of these samples, nevertheless, reacted positively in the three principal dilutions (1:25-50-100) by the same technic employed throughout the study. We also rebled three positive cows 73 days following the initial test and found each of them strongly positive (tube technic) in the three dilutions.

After discarding the first two, three or more jets from each quarter, composite samples of approximately 10 cc. were collected from each cow in sterile tubes containing a small quantity of powdered renin. The milk and renin were thoroughly mixed by inverting the tube several times. The tubes were then placed in a slanting position to facilitate the isolation of lakes and thus eliminate the necessity of centrifuging in the majority of instances. With this method it was possible to obtain clear serum from practically all of the samples. In the few cases where the casein failed to coagulate sufficiently to liberate the serum, or when a precipitate was present, these samples were centrifuged at 3,000 r.p.m. for ten minutes. On delivery to the laboratory, the samples were refrigerated at 5° C. until examination, which in no case exceeded seven days.

We modified our technic to a minor extent, and freely consulted Kolmer and Boerner,[2] and Todd and Sanford.[3]

It is conceded that separate samples from each quarter of all cows concerned would have been desirable, but we were not in a position to conduct such a detailed study. Our purpose did not warrant this procedure, as we were interested only in actual field conditions, in the incidence of agglutinins in the milk that was being added to the output constituting the raw milk supply, and in the detection of these antibodies in this milk by the rapid plate method commonly used by practitioners in the field.

Since we believed that the actual detection of agglutination macroscopically (regardless of the extent of occurrence) was sufficient evidence to warrant a positive or negative diagnosis in each one for this particular study, no reactions other than + or — were recorded. Reactions designated as incomplete, suspicious, +1, +2, etc., were entirely ignored. Our purpose was to determine the percentage of reactors that were shedding the antibodies through the milk, as detected by the rapid plate method, and to establish a clinical picture of the possible hazard to public health in the consumption of raw milk obtained from these reacting herds.

The significance of the various titres of milk serum has been demonstrated by Fitch,[4] Smith,[5] Torrey[6] and others. Therefore, on the basis of the observations made by them, it is not difficult to interpret the findings of the study herein reported. Since the interpretations of these investigators vary, we do not presume to duplicate, refute or substantiate their work. We merely desire to place our results on record so that, possibly, they may aid in determining the danger to public health if and when a standard we can all approve is established. We do believe, however, that the results of this study have value, since the source of all samples examined was not pre-controlled or selected, and did not come from artificially inoculated animals, but from those infected under natural field conditions.

Where the milk supply is largely whole raw milk from several herds or many smaller herds which has been thoroughly mixed in the process of bottling, the possible danger is obviously reduced to the minimum by dilution. If, on the other hand, the milk supply consists wholly of pasteurized milk,[7] then the hazard is automatically eliminated and public welfare no longer endangered. Under these latter conditions it would appear that the economics of the dairy industry alone represents the main issue, if the milk supply concerned is properly handled and pasteurized—apparently the Utopia to be realized only in the distant future.

Huddleson[8] has shown that the degree of error or variation in the accuracy of either the rapid plate or tube method is

practically negligible when both methods are used by competent operators and, as our controls would seem to suggest, either method would be sufficiently accurate for all practical and field purposes, and also from the clinical viewpoint. Each sample being composite, each was believed to represent the actual status of the individual cow in so far as the presence or absence of agglutinins was concerned. We made no attempt to interpret those findings in regard to the presence of *Br. abortus*, as laboratory animals for diagnostic purposes were not available.

In the higher titres there was a fluctuation which seemed to vary with the neighborhood or particular herd. We concluded from this observation that there was a marked variation in the apparent virulence of the infection in some herds and some communities, or possibly a definite tendency toward mammary localization. This, we believe, was undoubtedly due to the faulty systems of husbandry practiced in these sections and to the traditional customs of trading cattle frequently. This observation was further substantiated when the extreme northern portion of Mecklenburg county was area-tested for the first time with an astonishingly low occurrence of infection in comparison with the remaining part of the county as a whole. Incidentally, in that particular area husbandry is practiced on a more practical, disease-control basis than in the remainder of the county. This is due in part to the small scale of dairy operations, the almost complete absence of commercial herds, the small size of individual herds, and the fact that no appreciable exchange of cattle from one dairy to another through the medium of dealers occurs. Neither is the vice of using the neighbor's bull as prevalent.

On samples collected from certain herds and from definite local areas, such as townships, we obtained a varied positive agglutination curve which appeared to be high or low for no apparent reasons other than those just mentioned.

Throughout this entire study, the antigen used was produced by one manufacturer and was of the same lot as indicated by the serial numbers appearing on the labels of the containers, thereby reducing to a minimum the errors caused by the variation in the sensitivity of commercial antigens pointed out by Fitch.[9]

Further to guard against errors, this

Visit the National Capital in August

—Photo by Harris & Ewing.

The United States Supreme Court building in Washington, D. C.

work was done by both of us. We frequently checked our interpretations and individual technic by reversing the order of performance and by duplication. Often after making our own determinations we submitted the same sample of serum to the laboratories of the U. S. bureau of animal industry at Raleigh, N. Car., for checking (tube method), the results of which are recorded in table I. This table also gives the comparative results for 42 such control samples by both technics.

We also examined samples of whole raw mixed milk obtained by a milk inspector from the delivery trucks of 55 retail establishments, all of which were negative in the three dilutions. This was done as a check on technic and antigen, and to ascer-

TABLE I—Comparative results of the tube and rapid plate technic in various dilutions, demonstrating agglutinins in control milk serum used in this study.

	Dilutions																	
	Tube Technic									Plate Technic								
	1:25	1:50	1:100	1:200	1:400	1:800	1:1,600	1:3,200	1:6,400	1:25	1:50	1:100	1:200	1:400	1:1,000	1:2,000	1:4,000	1:8,000
1	+	+	+	I	—	—	—	—	—	+	+	+						
2	+	I	—	—	—	—	—	—	—	+	—	—						
3	—	—	—	—	—	—	—	—	—	—	—	—						
4	+	—	—	—	—	—	—	—	—	—	—	—						
5	+	+	+	+	+	+	+	+	+	+	+	+						
6	—	—	—	—	—	—	—	—	—	—	—	—						
7	+	I	—	—	—	—	—	—	—	—	—	—						
8	+	+	+	+	+	+	+	+	+	+	+	+						
9	+	+	+	I	—	—	—	—	—	+	+	+	—	—				
10	+	+	+	+	—	—	—	—	—	+	+	+						
11	—	—	—	—	—	—	—	—	—	—	—	—						
12	+	I	—	—	—	—	—	—	—	+	—	—						
13	—	—	—	—	—	—	—	—	—	—	—	—						
14	+	+	+	+	+	+	+	+	+	+	+	+	+	+	—	—		
15	—	—	—	—	—	—	—	—	—	—	—	—						
16	—	—	—	—	—	—	—	—	—	—	—	—						
17	+	+	I	—	—	—	—	—	—	+	+	—						
18	—	—	—	—	—	—	—	—	—	—	—	—						
19	+	—	—	—	—	—	—	—	—	+	+	—						
20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
21	+	+	+	+	+	I	—	—	—	+	+	+						
22	+	+	+	I	—	—	—	—	—	+	+	+						
23	+	+	+	+	+	+	I	—	—	+	+	+	+	+	—	—		
24	+	+	+	—	—	—	—	—	—	+	+	+						
25	—	—	—	—	—	—	—	—	—	—	—	—						
26	—	—	—	—	—	—	—	—	—	—	—	—						
27	—	—	—	—	—	—	—	—	—	—	—	—						
28	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
29	+	I	—	—						+	—	—						
30	—	—	—	—						—	—	—						
31	—	—	—	—						—	—	—						
32	I	—	—	—						—	—	—						
33	—	—	—	—						—	—	—						
34	—	—	—	—						—	—	—						
35	—	—	—	—						—	—	—						
36	—	—	—	—						—	—	—						
37	—	—	—	—						—	—	—						
38	—	—	—	—						—	—	—						
39	—	—	—	—						—	—	—						
40	—	—	—	—						—	—	—						
41	—	—	—	—						—	—	—						
42	—	—	—	—						—	—	—						

+ = Positive. — = Negative. I = Incomplete.

tain whether or not such mixed milk from herds having a known high incidence of infection was carrying evidence of such.

As an additional check on the validity of our reactions, we took the serum of nine known negative (both tube and plate technic) samples of milk selected at random and divided each into two parts. One part we examined as usual, with negative results, and then prepared dilutions in the manner followed throughout this study. All being negative after five minutes in preparation, they were placed in a desiccating jar, in the bottom of which water at room temperature was placed to prevent evaporation, and the slides placed on the plate above this. The jar was sealed and held at room temperature for one hour. On examination (macro- and microscopically) each sample that had previously been negative in all dilutions remained so after the expiration of this period of time.

It having been suggested to us that all milk serums, if in contact with specific antigens for a sufficient length of time, would eventually agglutinate, we repeated this procedure on two other occasions, using a total of 22 samples known to be negative to the routine tube and rapid plate methods. All of these were obtained from animals whose blood serum reacted positively to the tube method and, as a result, were designated and slaughtered as reactors. Since we were unable to demonstrate this phenomenon as a fact after the latter eleven samples were held in preparation for 72 hours (under the conditions described above) and all examined both macro- and microscopically for agglutination, with negative results, this possibility of error was immediately discounted. The serum of the other part of each of these control samples was submitted to the aforementioned laboratories for checking against the tube method. The results were negative in each case.

Although we did not originally intend to make determinations on dilutions higher than 1:100, a few higher titres were recorded as the study progressed. We considered these positive reactions as nothing more than a curiosity and, as can be determined from table II, only a few were examined. This explains the abrupt fall in the number of samples carried above 1:100. However, a total of 1,900 separate dilutions was made on the original 500 cows. In cases where the agglutinins were extremely abundant, the high dilutions were made, and it is quite possible that many more positive serums would have been found had the higher dilutions been made routinely.

TABLE II—Total number of milk samples tested in each dilution, the number of positive and negative reactions and the percentage in each case.

	Dilution								
	1:25	1:50	1:100	1:200	1:400	1:1,000	1:2,000	1:4,000	1:8,000
Reaction +	317	288	220	100	77	29	23	5	4
Reaction —	183	212	280	43	56	28	29	5	1
Total No. of samples tested	500	500	500	143	133	57	52	10	5
Per cent +	63.4	57.6	44	69.93	57.89	50.87	44.23	50	80
Per cent —	36.6	42.4	56	30.06	42.1	47.12	55.76	50	20

Table I shows a variation of 1.17 per cent between the two methods used throughout this study and as controls; incomplete reactions were entirely disregarded for reasons mentioned elsewhere.

Table II shows at a glance the total number of milk samples tested in each dilution, the number of positive and negative reactions, and the percentage in each case.

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A Study of an Outbreak of Acute Swine Erysipelas in One Herd

By H. W. SCHOENING,* V.M.D., J. E. PETERMAN,† D.V.M., and C. G. GREY,‡ D.V.M.

IN A RECENT (October 1939) swine-erysipelas survey in eastern Nebraska, an outbreak of acute swine erysipelas was seen in a herd of hogs at the height of the disease. It was possible to make a rather complete study of the outbreak, and since swine erysipelas is becoming an increasingly important disease of swine in certain sections of the United States, it is believed that a report of this case will be an addition of value to the literature on swine erysipelas in this country.

HISTORY OF FARM ON WHICH OUTBREAK OCCURRED

This farm is well managed and is above the average in respect to sanitation. It consists of rolling land and is well drained. The principal crops are corn and small grains. The present owner has lived on this farm for twelve years and has been raising hogs and cattle during the entire period.

No serious sickness had appeared in the hogs prior to 1939, with the exception of an outbreak of hog cholera in 1932. He had not had any other types of infections except that when he raised fall pigs, they contracted what he called "flu." For the past two or three years he has raised few fall pigs and has not observed the so-called flu in the herd.

That there has been some indication of erysipelas in a low-grade form in this herd appears from the fact that the owner stated that in the early fall of 1937, three or four spring pigs developed enlarged joints. No losses occurred but these pigs did not thrive properly and were slow in putting on weight. Also, for the past three or four years some of the suckling pigs have developed the scours, and in some of these the tails dried up and dropped off.

HISTORY OF THE HERD IN 1939

The owner stated that, in the spring of 1939, 20 sows farrowed between 140 and 150 pigs. One of these sows was sick for a week at farrowing time. She dried up in her milk and all of the pigs died, but the sow made a recovery. He also noted that several other sows apparently were not giving any milk and the pigs started to die within two or three days after farrowing. Approximately 75 of these pigs died within six or seven days. Seventy-four head were saved. Four of these lost their tails during the suckling period. One of the four pigs died during the October outbreak, of which this paper is a report. The other three are still on the farm but now present a typical picture of chronic swine erysipelas by their stunted growth and loss of tails.

Since one sow farrowing in the spring was noted to be visibly sick, it is possible that the other sows which stopped their milk flow might have been sick at the same time but not sufficiently so to attract the owner's attention. From the above history it is very probable that swine erysipelas

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(*Continued from preceding page*)

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was present on this farm without the owner's recognizing the condition.

ACUTE OUTBREAK IN OCTOBER 1939

On September 13, 1939, there were 74 head of swine on the premises which apparently had done fairly well, although they were an uneven lot of hogs. No losses occurred after weaning until September 14, when one hog was found dead. On September 21, the owner noticed that several hogs were vomiting, but they did not appear to be sick and their appetite apparently was not impaired. No more losses occurred until October 2, 1939, when two were found dead. On October 4, three more were found dead and, on October 5, there were six more found dead.

On October 5, two of us were in the neighborhood of this farm and were advised of the losses of the day before. The farm was visited and 39 hogs were found visibly sick, showing clinical signs of swine erysipelas. Of these, some were sore and stiff when aroused and had arched backs. Others were acutely sick and thumping markedly, and these did not show any stiffness and soreness. Nearly all were off feed. A few had a staggering gait which somewhat resembled hog-cholera cases. The apparently well hogs had been shipped to market just prior to our visit. Of the 39 head kept on the farm, all were treated with 20 cc. of anti-swine-erysipelas serum on October 4 and 5, 1939.

In addition to the 74 spring pigs mentioned above, there were two sows and nine fall pigs on this farm in an adjacent lot. When the losses of the early part of October occurred, these hogs were not given anti-swine-erysipelas serum and they remained well until October 12, when the owner noticed one sow was sick. He then treated the two sows and nine pigs with serum. Two days following this, the other sow and two of the pigs were also sick. When these hogs were observed on November 3 by one of us, one sow showed typical erysipelas lameness with a developing arthritis and a sloughing of the skin on the ears and hind quarters. The other sow and two pigs were slightly lame.

STATUS OF HERD IN NOVEMBER 1939 AND MARCH 1940

On November 3, 1939, the farm was again visited by one of us and the following additional history was reported. Seven of the sick hogs had died, five of which succumbed within five days after treatment. One lingered about two weeks and then died. The herd seemed to be holding its own until October 25, when another hog was noticed to be sick. This animal was given anti-swine-erysipelas serum again but died on November 3, 1939. The total loss in this herd to date of November 3 was 19. Among the surviving animals, when seen on November 3, many were crippled with arthritis in varying degrees. The animals were gaunt and losing weight, whereas others were stunted but showed no external lesions of any kind. Only about eight or ten head were apparently normal and seemed to be thrifty. About 20 head showed evidence of having sloughed part of their tails.

The farm was again visited in March 1940 by two of us. The owner reported that about November 30, 1939, many of the hogs became sick again with what he considered to be erysipelas. He administered anti-swine-erysipelas serum to all of these sick animals. None died and a few days later they seemed much improved. All of his hogs were marketed shortly thereafter.

AUTOPSY AND LABORATORY FINDINGS

On the occasion of the visit to this farm on October 5, 1939, an autopsy was held on one hog about 6 months of age and weighing about 175 lbs. This hog had died about an hour previous to our visit. There were no discolorations of the skin or other external lesions. The lymph glands were enlarged, edematous, and had a par-boiled appearance with a bluish-violet color congestion. There was no petechiation on the epiglottis. The tonsils were normal. The lungs were congested, edematous and showed some signs of beginning pneumonia. There were a few petechiae on the kidneys and some evidence of nephritis. The bladder showed a few

very small petechiae in one area. The mucous surface was reddened and congested. The spleen was somewhat enlarged, and on the serous surface of the stomach there was a slight extravasation of blood. The mucous surface of the stomach was highly inflamed with a bluish-violet color. The liver was congested and soft.

Specimen tissues from this hog, including the heart, lungs, liver, kidney, lymph nodes and spleen, were covered with a liberal supply of borax and wrapped in newspaper and placed in the rear of our automobile. Some hours later it was possible to get dry ice, and the tissues were placed in a bucket containing this material. They were repacked later in dry ice, shipped to the pathological division at Washington, D. C., and were received on October 9, 1939, in excellent condition.

Blood smears from the heart showed small, Gram-positive rods, some slightly curved and some coccoid. The heart, spleen, liver, kidneys, lungs and lymph nodes were cultured in broth and on serum agar. All of the tissues yielded in pure culture Gram-positive rods similar culturally, morphologically and serologically to *Erysipelothrix rhusiopathiae*. The blood from the heart was tested by the plate agglutination test with negative results. The absence of reaction may be explained on the basis of an acute case in which sufficient time had not elapsed for the formation of agglutinins. Mice were inoculated with blood and splenic emulsions and died within three days. The swine erysipelas organisms were isolated from each animal.

SWINE INOCULATIONS

Since the mortality from this outbreak was high and since material forwarded from the field arrived in excellent condition at the laboratory, a series of inoculations into swine were made with various cultures and tissues. It has been an extremely difficult matter to reproduce swine erysipelas with any degree of regularity by inoculations of cultures and other materials from swine affected with the disease. We have had some limited success in this respect, as noted by Creech in a previous publication,[1] but our attempts in recent years to produce the fatal disease by artificial means have met with little success.

In all, nine hogs have been inoculated with material or cultures from the Nebraska case. In addition, a normal hog had contact with some of these hogs. Of this group of animals, six have died of swine erysipelas and four have developed the chronic type of the disease; this includes the contact.

Hog 5232 was inoculated intravenously with 20 cc. of splenic emulsion from the original Nebraska hog 10-11-39; dead 10-14-39, swine erysipelas.

Hog 5234 was inoculated with 20 cc. of a pooled 48-hour broth culture from kidney and blood from the original Nebraska hog, injected intravenously 10-11-39; dead 10-16-39.

Hog 5245 was inoculated subcutaneously with 2 cc. of a 24-hour blood culture from blood of hog 5234, 10-17-39; dead 11-2-39.

Hog 5244 was inoculated with the above material intravenously 10-17-39; dead 10-21-39.

Hog 5242 was inoculated with the above material intramuscularly 10-17-39; chronic swine erysipelas 11-16-39.

Hog 5241 was inoculated 10-17-39 intravenously with 2 cc. of a 48-hour frozen broth culture from the spleen of the original Nebraska hog; chronic swine erysipelas 11-16-39.

Hog 5225 was inoculated subcutaneously with 2 cc. of the above material 10-17-39; dead 12-25-39.

Hog 5217 was inoculated intravenously with 20 cc. of the above material 11-14-39; chronic swine erysipelas 12-17-39.

Hog 5215 was inoculated subcutaneously with 20 cc. of the above material 11-14-39; dead 11-22-39.

Hog 5240 was placed in contact with hogs 5232 and 5234, 10-14-39; chronic swine erysipelas 11-27-39; moribund and destroyed 1-30-40.

The splenic filtrate from the original Nebraska hog 132 was injected into a cholera-immune hog, 5235, and a cholera-susceptible hog, 5265, on 11-21-39. Hog 5235 was slightly off feed 11-28-39, but was other-

wise normal and was released 11-28-39. Hog 5265 had reddened ears for a few days, but was otherwise normal and also was released 11-28-39.

All of the hogs that died were subjected to autopsy, and *E. rhusiopathiae* was recovered from all tissues. Since it is not feasible to give the detailed clinical and autopsy findings on each animal, the following will suffice to illustrate our observations in the acute cases.

CLINICAL AND AUTOPSY FINDINGS IN HOG 5232

Hog 5232 was inoculated 10-11-39 intravenously with 20 cc. of splenic emulsion from the original Nebraska case. Twenty-four hours following inoculation there was a recorded temperature of 106.4° F., and the hog was definitely off feed. On 10-13-39, diamond- or rhomboidal-shaped skin lesions appeared scattered over the body. The ears were thickened and the snout was swollen and discolored. The hog spent most of its time lying down, but would jump up when disturbed. The joints were extremely tender and the hog tried to keep its feet under its body, accentuating a long and extremely arched top line. The whole blood was negative for swine erysipelas. The temperature on this date was 107.4° F. The animal died the following morning.

Postmortem Findings.—The skin was reddened with a formation of typical diamond-shaped areas scattered over the body (fig. 1). The submaxillary lymph nodes were slightly swollen, edematous, and somewhat congested. The tonsils showed a bluish-red discoloration and the epiglottis was congested. The heart showed diffuse congestion of the fat at the base of the ventricles. A few ecchymotic spots were observed on the lungs, with congestion at the cardiac lobes. The liver and kidneys showed some congestion. The mucous surface of the stomach showed a diffuse infiltration which was of a red color with a slightly bluish tint. The mesenteric lymph nodes were congested. There was a slight enteritis throughout the intestinal tract. There was inflammation of the synovial membranes of the joints, but no appreciable thickening of the membranes or fibrous proliferation.

Fig. 1. Swine erysipelas: Rhomboidal or diamond-shaped skin lesions. This specimen was taken from hog 5232, which was inoculated intravenously on October 11, 1939, with 20 cc. of splenic emulsion from the original case. The animal was dead on October 14, 1939.

E. rhusiopathiae was isolated from the various tissues and joints of this case.

DISCUSSION

Swine erysipelas has undoubtedly existed in this country for a number of years, at least in a chronic form. It has been only within the past decade, however, that the disease has been recognized in the acute form constituting a herd disease. This report brings out the fact that the chronic form of the disease on a farm may at some time be followed by an acute outbreak of the disease, involving the entire herd.

The low-grade, chronic type of swine erysipelas may smolder in a herd for years, being of such a low-grade type that the disease is not recognized by the owner. Just what the factors may be that are responsible for the development of the acute type of the disease in such a herd are unknown.

The experimental hog inoculations indicate the high virulence that swine erysipelas organisms may attain in an acute outbreak. They also bring out the point that the typical diamond-shaped lesions on the skin may occur early in the acute, fatal type of the disease.

SUMMARY

A field and laboratory investigation was made of an outbreak of swine erysipelas occurring on a farm in eastern Nebraska in October 1939. The history of this farm indicated that swine erysipelas was present prior to the fall of 1939 in a low-grade, chronic form not recognized by the owner. An acute herd infection appeared in October 1939, resulting in a loss of 19 animals and the crippling of many of the survivors. The swine-erysipelas organism recovered from this outbreak was virulent for hogs, and of nine animals injected either with cultures or splenic material kept in a frozen state until used, it was possible to produce death in six of these animals and the development of the chronic form of the disease in three. One hog placed in contact with some of the inoculated animals developed chronic swine erysipelas.

Reference

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Legally Contagious Bovine Tuberculosis

In a long and detailed discourse analyzing the laws governing the handling of bovine tuberculosis by the veterinary service [France], Verge and Drieux set down the following conclusions as to what constitutes a legally contagious form of the disease.

1) Advanced pulmonary tuberculosis:

a) In living animals, clinical symptoms of a chronic pneumopathy with positive reaction to the tuberculin test or the presence of the tubercle bacillus in the respiratory discharges.

b) On the cadaver, voluminous or multiple lesions of the pulmonary parenchyma, the bronchial tree and trachea which are anatomo-pathological forms of the process.

2) Tuberculosis of the intestine:

a) All intestinal lesions observed, whatever may be their form, character, extent, volume or multiplicity of the specific alterations.

3) Tuberculosis of the mammae:

a) In the living animals, clinical signs of mammary tuberculosis; the presence, with or without clinical signs, of authenticated tubercle bacilli in the milk aseptically drawn.

b) In the cadaver, all tuberculous lesions of the mammary parenchyma or retromammary lymph glands.

4) Tuberculosis of the uterus:

a) As in intestinal tuberculosis, all lesions of tuberculous origin, regardless of form, character, extent, volume or multiplicity of specific alterations observed.

From the legal point of view in the past, there were two varieties of bovine tuberculosis: One legally contagious and one not legally contagious. Only the first variety justified resort to police sanitary measures under the laws of 1898 and of 1934. The other variety remained officially unknown to the police powers until owners solicited governmental aid under existing codes. (*J. Verge and H. Drieux. Les Formes Légalement Contagieuses de la Tuberculose Bovine. Bulletin de l'Académie Vétérinaire de France, xii, December 1938, pp. 403-412.*)

Studies on Equine Encephalomyelitis in Iowa During 1939*

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AT PRESENT it is recognized that two types of equine encephalomyelitis virus exist in the United States. The eastern type, formerly reported from a relatively narrow coastal zone in the eastern United States, was recently found in Canada, west of the Appalachian mountains. A similar occurrence was reported from Alabama. Should the previously recognized geographical distribution of these two virus types change materially, a serious situation might arise in horse populations not immunized against a virus type hitherto unrecognized in the areas. The possible existence of a heretofore undescribed virus type also must be kept in mind.

Until 1939, only an insignificant number of field-virus strains from horses in Iowa had been typed. In 1935, we typed two Iowa strains. These proved to be of the western type. Subsequently, in 1937, the pathological division of the federal bureau of animal industry, Washington, D. C., typed two Iowa strains. These few type determinations did not eliminate the possibility of the occurrence of another type or types in Iowa among the many cases of equine encephalomyelitis diagnosed clinically during the past eight or nine years. In coöperation with the federal bureau of animal industry, other agencies and practitioners,† the Veterinary Research Institute at Ames, Iowa, established as many field-virus strains from Iowa as possible. After such establishment in guinea pigs, the type of virus was determined.

The first case of suspected equine encephalomyelitis referred to us in 1939 originated from a farm located several miles east and north of Zearing, Iowa, on July 12 (table I). The owner had eight horses. The animals had not been vaccinated in 1938 and anti-encephalomyelitis serum was not used at any time. No losses were observed in the wild life of the vicinity. On May 4, 1939, a horse died on another farm west of Zearing. A clinical diagnosis of virus encephalomyelitis was made by the practitioner, but, unfortunately, no tissues were submitted to the laboratory from that case.

On July 8, a horse died on the farm from which case 1 originated. The animal showed a temperature of 103° F., marked icterus and symptoms which the local veterinarian considered to be suggestive of encephalomyelitis. On the same day that this horse died, a 5-year-old mare (case 1) showed a subnormal temperature with "symptoms of encephalomyelitis." On July 9, the temperature of this mare was 102° F. The next day she appeared markedly icteric and had a subnormal temperature. The mare was down and unable to rise on July 12, when she was destroyed for autopsy and the collection of tissues. Following the autopsy, the attending veterinarian stated that this mare had suffered an attack of encephalomyelitis in August 1938, having been sick for about ten days. All of the horses on this farm were vaccinated on May 9 and May 16, 1939, with chick-embryo vaccine. The vaccine was brought from a nearby distributing agency in a cooled thermos jug and held under refrigeration until used.

The mare was destroyed by bleeding from the jugular vein. The meninges were edematous and of a grayish, turbid appearance. No areas of liquefaction were found in the brain. Formalin-fixed tissues and frozen sections from the brain revealed considerable congestion and some microscopic hemorrhages. No cellular changes suggestive of virus encephalomyelitis were found. The spleen was not significantly enlarged, but

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†Grateful acknowledgment is made for the assistance of the staffs of J. A. Barger, U. S. veterinary inspector in charge of Iowa, and H. A. Seidell, chief of the Iowa division of animal industry, and Iowa practitioners who coöperated.

TABLE I—Field cases.

CASE NO.	DATE (1939)	TOWN (IOWA)	VACCINATED (CHICK EMBRYO)	PATHOLOGY	BIOLOGICAL RESPONSE IN GUINEA PIGS
1	7–12	Zearing	+ (Vet.)	0	0
2	7–15	Iowa City	+ (Vet.)	0	0
3	7–22	Newell	0	0	0—Contaminated
4	8–3	Clinic	+ (Vet.)	0	0
5*	8–15	Grinnell		0	0
6	8–17	Randall	0	+	+
7	8–21	Garwin	+ (Vet.)	0	0
8	8–23	Waucoma	0	+	0
9	8–23	Winterset	+ (Owner)	0	0
10	8–26	Tripoli	+ (Owner)	0	0
11	8–28	Kalona	0	+	+
12	8–29	West Bend	0	S	0—Contaminated
13	8–29	Cumberland	0	+	0—Contaminated
14	8–30	Independence	0	+	0—Contaminated
15	8–30	Rudd	0	+	0—Contaminated
16	8–31	Armstrong	0	+	0
17	9–1	LeMars	0	S	0
18	9–1	Waukon	0	+	+
19	9–2	Maquoketa	0	0	0
20	9–4	Storm Lake	0	+	0—Contaminated
21	9–5	Buffalo Center	+ (Vet.)	0	0—Contaminated
22	9–5	Winterset	0	+	+
23	9–7	Creston	0		0—Mouldy corn
24	9–7	Graettinger	0	0	0
25	9–8	Tipton	0	+	0—Contaminated
26	9–9	Atlantic	0	+	0—Decomposed
27	9–10	Rutland	0	0	0
28	9–11	Marshalltown	0	+	+
29	9–14	Springville	0	+	0—Contaminated
30	9–15	Marshalltown	0	+	+
31	9–19	Mt. Pleasant	0	+	+
32	9–22	Washington	0	+	+
33	10–4	Logan	—	0	0—Teratomatous cyst

*Squirrel. S = Suspicious.

the lymph nodes were increased in size. The liver was enlarged and appeared mahogany and yellow mottled. It was slightly friable. The intestinal serosa, connective tissue and musculature appeared yellowish orange. No other abnormalities were noted in the gastrointestinal tract.

Bacteriological examinations of the spleen, liver, kidneys and brain were negative. Animal inoculations of spleen, liver, kidney and lymph nodes also were negative. Intracerebral inoculation of brain and anterior spinal cord emulsions into guinea pigs failed to kill or produce clinical symptoms. Histological studies of various portions of the brain (see table II) did not reveal changes that could be considered as suggestive of virus encephalomyelitis.

The horses on this farm were stabled and fed a good grade of hay and clean grain. No evidence of the presence of a poisonous plant could be established. This case (No. 1) is described briefly because it is typical of a number of losses reported during the late spring and early summer in which no evidence of virus encephalomyelitis has been demonstrated by laboratory methods. Future research efforts should be directed to this type of case in order to clarify the situation with reference to equine encephalomyelitis.

Cases 2, 4, 7, 9, 10 and 21 (table I) are included in the same group as case 1 because they were vaccinated horses which died or were killed in a moribund condition and were suspected of having virus encephalomyelitis but failed to show histological evidence of the affection, and attempts to establish virus in laboratory animals by intracerebral inoculation of brain tissue were unsuccessful.

On August 17, the first positive case (No.

TABLE II—Histopathology.

Case No.	Date (1939)	Location	Encephalomyelitis Lesions					
			Ant. Cord	Medulla Pons	Olfactory	Optic	Piriform	Hippocampus
1	7-12	Zearing	—	—	—	—	—	—
2	7-15	Iowa City	—	—	—	—	—	—
1) 3	7-22	Newell				—	—	—
4	8-3	Clinic-Ames	—	—	—	—	—	—
2) 5	8-12	Grinnell	—	—	—	—	—	—
6	8-17	Randall	+	++	++	++	++	+
7	8-21	Garwin	—	—	—	—	—	—
8	8-23	Waucoma	ǂ	+	++	++	+	++
9	8-23	Winterset	—	—	—	—	—	
10	8-26	Tripoli	—	—	—	—	—	—
11	8-28	Kalona	+	++	++	++	++	+
12	8-29	West Bend		S				
13	8-29	Cumberland	—	++	+	++	+	+
14	8-30	Independence	+	++	++	+	++	+
15	8-30	Rudd	ǂ	+	+	+	+	+
16	8-31	Armstrong	ǂ	++	++	++	+	+
17	9-1	LeMars	—	—	—	—	—	—
1) 18	9-1	Waukon	+	+			++	
1) 19	9-2	Maquoketa		—				—
20	9-4	Storm Lake	+	++	+	++	++	++
21	9-5	Buffalo Center	—	—	—	—	—	—
22	9-5	Winterset	+	++	++	++	++	+
3) 23	9-7	Creston	—	—	—	—	—	—
24	9-7	Graettinger	—	—	—	—	—	—
25	9-8	Tipton	+	++	+	+	+	ǂ
26	9-9	Atlantic	+	+	+	ǂ	+	+
27	9-10	Rutland	—	—	—	—	—	—
28	9-11	Marshalltown	++	++	++	++	+	+
29	9-14	Springville	++	++	+	++	+	+
30	9-15	Marshalltown	ǂ	+	+	++	+	+
31	9-19	Mt. Pleasant	+	++	+	++	++	+
32	9-22	Washington	+	++	++	++	++	+
4) 33	10-4	Logan	—	—	—	—	—	—

— = Negative.
ǂ = Slight changes of virus encephalomyelitis.
+ = Definite histological evidence.
S = Suspicious.
++ = Severe changes.

1) Incomplete specimen.
2) Squirrel.
3) Mouldy corn poisoning (leucoencephalomalacia).
4) Brain tumor.

6) came to our attention. It originated in the vicinity of Randall, Iowa. The horse was not vaccinated. The brain presented positive histological evidence of encephalomyelitis and the virus was established in guinea pigs on the third attempt. The virus was of the western type.

On August 28, another positive case (No. 11) came from Kalona. The horse was not vaccinated. On September 1, case 18 was submitted from Waukon. The histology of the brain was positive. Virus from this case was established in guinea pigs. Occurring in the northeastern section of the state with a history of a short clinical course accompanied by violent symptoms, this case appeared significant. From the brain a virulent virus was obtained which upon typing, however, proved to be of the western type. Subsequent cases in which a positive histology was found and from which provisionally typed western virus was established in guinea pigs are as follows:

No. 22	Winterset	Sept. 5
28	Vicinity of Marshalltown	11
30	Vicinity of Marshalltown	15
31	Mt. Pleasant	19
32	Washington	22

The number of immunized guinea pigs available in this laboratory when the virus strains were isolated was inadequate for final type determinations (table III). In case 31, no eastern type-immune pigs were available, and pigs 450 and 422 (western

immunes surviving a previous test) were inoculated with virus strain 31. In preliminary confirmatory tests conducted by the pathological division, all controls and all eastern immunes succumbed with strains 11, 18, 22, 28 and 30. With strains 6, 31 and 32, a few irregularities were encountered, although the predominant indications point clearly to these being of the western type.* It must be kept in mind that when the typing tests were conducted these strains had undergone relatively few guinea pig passages and at that time their behavior was somewhat irregular in susceptible guinea pigs. During the past two months, the intracerebral inoculation of 0.1 cc. of a 1:100 dilution of these strains into guinea pigs has been followed by symptoms and death in practically every case. The killing time of some has been reduced to about three days. The eight strains are being passed through guinea pigs twice each month and soon will be subjected to typing tests in which larger numbers of immune pigs will be used.

TABLE III—Typing tests.

STRAIN	EASTERN IMMUNES	WESTERN IMMUNES	CONTROLS
6	7434* 7449*	413— 7435‡	19* 20— 21—
11	2949— 3102†	420— 92—	12* 13* 14†
18	2946* 2942*	446— 426—	16* 17* 18*
22	7440* 2931* 2937*	32‡ 77— 407—	116‡ 117* 118*
28	91‡ 3144*	450— 422—	7* 8* 9†
31		450— 422—	28‡ 29* 30* 31* 32† 33†
32	7427* 7450*	46— 89‡	216* 217*

* = Died following clinical manifestations.
† = Recovered following clinical manifestations.
‡ = Died prematurely.
— = No response.

Cases 8 and 16 presented indisputable histological evidence of virus infection, but none could be established in guinea pigs. Four attempts were made from August 24 to September 25 to establish virus from case 8, but the results were negative. Brain tissue from case 16, Armstrong, Iowa, was repeatedly injected at weekly intervals until the brain tissue stored in glycerin was exhausted. Virus was not established in guinea pigs. In the absence of bacteria, these two cases can be designated as positive only on the basis of the histological evidence.

The seven cases listed below revealed positive histological pictures, but due to bacterial contamination of the brains, animal-inoculation procedures were fruitless.

No. 13 Cumberland
14 Independence
15 Rudd
20 Storm Lake
25 Tipton
26 Atlantic
29 Springville

Thirty-two horse brains and one squirrel were examined for encephalomyelitis. Seventeen, or 53.1 per cent, of the horse brains showed histological evidence of virus infection (table II). From eight cases, or 25 per cent of the horse brains examined, virus was established by intracerebral inoculation of guinea pigs. The seven negative cases include one case of mouldy corn poisoning and one showing a teratomatous cyst in the cranial cavity. The horse affected with mouldy corn poisoning presented some of the symptoms observed in equine encephalomyelitis. The pressure on the base of the brain caused by the teratomatous cyst in case 33 produced a clinical effect similar to that caused by the destructive action of the virus.

The histopathological studies of this series indicate that the histological changes in the positive cases are quite constantly present in the areas of the brain mentioned

*Personal communication.

in table II. The anterior cord and hippocampal region of this series revealed less severe histological changes than those found in the medulla, pons, olfactory, optic and piriform lobes.

SUMMARY

During the summer of 1939, one squirrel and 32 horse brains were examined for virus encephalomyelitis in Iowa. Seventeen, or 53.1 per cent of the horses studied, presented histological evidence of virus encephalomyelitis. From eight, or 25 per cent, virus of the western type was recovered. Seven histologically positive cases were contaminated. Guinea pigs inoculated with brain tissue from these died within eight or ten hours following injection. Berkefeld filtrates prepared from some of the contaminated brains failed to infect guinea pigs.

The 17 histologically positive cases occurred in unvaccinated horses. In eight unvaccinated horses, no evidence of virus infection was found. A case of mouldy corn poisoning and one presenting a teratomatous cyst in the cranial cavity were included in the last-mentioned group. Seven specimens from vaccinated horses were examined and no evidence of a virus infection was found in them.

Regional Laboratories for Diagnosis and Research

Secretary Mark Welsh of the United States Live Stock Sanitary Association emphasizes the importance of conveniently located laboratories to aid practitioners in the pursuit of their work and thus replace guessing and empiricism from the therapeutics and prophylaxis of the present time. In this connection, Dr. Welsh reports:

> From 1930 to 1935, we had only one laboratory here at College Park [Md.] and we were averaging some 100,000 to 125,000 diagnoses a year on blood, milk, tissue and other samples submitted.
>
> In 1935 and 1936, we built a branch laboratory in Baltimore to take care of that portion of the state. A short time later it became necessary to put another laboratory on the lower eastern shore at Salisbury because of the difficulty of getting specimens across the bay to our College Park laboratory in a satisfactory condition. Instead of relieving our central laboratory of much of our work, the branch laboratories developed so much new work that we were busier than ever. In May of last year we put a laboratory on the upper eastern shore at Centreville to take care of that section, and it is now keeping a veterinary pathologist and two helpers very busy.
>
> It is our experience that where veterinarians, stockmen, poultrymen and others find that they can get a rapid, accurate diagnosis of their cases, they promptly avail themselves of the opportunity. The county in which a laboratory is located furnishes the space and services. The state equips the laboratory and, together with the federal government, provides the personnel. The costs of the state reach about $5,000 a year in the operation of each of the branch laboratories. They are, however, serving sections in which the assessed value of the live stock and poultry totals $8,000,000 to $10,000,000.
>
> At a tax rate of at least $1 per hundred, I feel that the $5,000 we spend is a relatively low health-insurance premium on the investment we are protecting.

In an address before the American Chemurgic Conference of Agriculture, Industry and Science in Chicago, March 29, F. L. Livingston of the E. I. duPont de Nemours Company, complimented the federal government for establishing regional research laboratories but criticized Congress for not appropriating sufficient funds to carry on research work of tremendous importance to the people. In other words, the American people are little aware what research has done for them and, in general, are little interested in the unsolved problems stretching ahead.

At the *Journées Vétérinaire d'Alfort* (veterinary conference) of 1939, Professor Lesbouyries of the Alfort veterinary school, in an address on causes of interrupted reproduction in animals, said that the veterinarian will remain in the realm of empiricism until regional laboratories are put at his disposition to clarify the etiology and point the right therapy and prophylaxis of the troubles he meets in his daily work. "For a long time," this savant went on to say, "we have courted the hope that such institutes be established, as certain other countries have done, to furnish stations of research and aid (to practitioners) and to build up an understanding of their value."

Enteritis in Dogs and Some of Its Complications*

By LEONARD W. GOSS, D.V.M.
Columbus, Ohio

ENTERITIS is perhaps the most common ailment of dogs. The causes of this disease may be classified as follows: Dietetic factors, irritating substances, and lowered resistance secondary to other diseased conditions—principally parasitism and distemper.

The inflammation of the dog's intestine may be classed as catarrhal in the great majority of cases and, therefore, this discussion will be confined largely to that condition, with an endeavor to explain the pathological processes in the inflammation and the conditions which bring about the associated complications.

CAUSES OF CATARRHAL ENTERITIS

Catarrhal enteritis develops because of the presence of irritating substances within the intestinal tract. They may have been taken in with food or administered intentionally or accidentally, but in most cases the irritating substances are the result of bacterial propagation due to lowered resistance.

Diet.—In many instances the dietary lacks some of the essentials. Iodine deficiency was common in the past, but that is now being partly eliminated by the use of cod liver oil in commercial dog foods, with a resultant gradual decrease in the average size of the thyroid gland.

Parasites.—Parasites are one of the most common offenders in puppies and in aged dogs which are kept in unsanitary quarters, as well as in dogs kept in clean homes but infested with fleas, should they be carriers of tapeworm cysts. The presence of intestinal parasites is conducive to enteritis of varying degrees, depending upon the extent of the infestation and the duration. Lowered vitality due to specific infections, such as distemper, or nonspecific infections is an important factor in the production of enteritis.

TOXIC SUBSTANCES IN RELATION TO ENTERITIS

The most important factor in disease is the accumulation of toxic material within the body at a rate of production which exceeds its elimination. The removal of the material or the prevention of its absorption is the most important control procedure. When the causative factors of disease are present, the vitality of the dog is lowered. This allows the intestinal flora to change from the normal by allowing the multiplication of the more pathogenic type of organisms which are capable of producing toxic substances. This toxic substance is irritating to the single layer of columnar epithelial cells which line the intestinal tract. It also causes congestion of the mucous membrane and is associated with an increased secretion of mucus, as is observed by the increase in the number of so-called "goblet" cells. These are the cells which fill with secretion because of the attempt to dilute this irritant. The exudate from the blood vessels is increased. This also is associated with increased secretion of the intestinal glands, giving the puppy a "pot-bellied" appearance, or, if associated with increased peristalsis, diarrhea will exist with accompanying dehydration.

The action of the products within the intestinal tract may become so intensified that it causes these protective epithelial cells to undergo albuminous degeneration, with subsequent death. This condition starts at the free tip end of the villi and proceeds downward as the intensity increases, until in some instances the villi are denuded of epithelium. The epithelium is present largely for protective and secretory purposes, and when this covering is destroyed, the underlying blood vessels are exposed to the toxic material in the in-

*From The College of Veterinary Medicine, The Ohio State University; presented before the Section on Small Animal Practice at the 76th annual meeting of the AVMA, Memphis, Tenn., August 28 to September 1, 1939.

testine, which is now absorbed by osmosis and diffusion. As this surface is extensive, large amounts of the highly toxic material undergo absorption; also, bacteria may enter and be carried to remote parts of the body. This toxic material acts upon the walls of the capillaries, causing varying degrees of degeneration of the endothelial cells and dilatation of the walls resulting in passive congestion. This is associated with the passage of the blood plasma, laden with toxins, into the surrounding tissues.

In the liver and kidneys the toxic material acts upon the parenchymatous cells, causing degeneration and connective tissue formation, and in the course of time it may result in induration of extensive involvement. The liver may undergo such extensive destruction of the functional epithelium and proliferation of the connective tissue as to impair its function to the extent that jaundice may result upon the slightest provocation, or it may interfere with the circulation of the blood to a degree that ascites develops with its usual complications.

The kidneys may become seriously affected, resulting in the presence of albumin and casts in the urine. If the destruction of the kidney tissue becomes very extensive, uremic poisoning will follow. This, in turn, will aggravate the conditions already existing in the intestine. If these toxic substances are from pathogenic bacteria, they will act upon the heat-regulating centers of the brain, causing constriction of the superficial blood vessels of the body and resulting in chills and an increase in the body temperature, which is more common in the acute cases. This passive congestion is readily noticed in the conjunctiva of the eye, a common symptom of enteritis, and on account of the poorly nourished condition, infection quickly takes place, resulting in purulent conjunctivitis and even ulceration of the cornea.

Blacktongue and Enteritis

A similar condition of passive congestion occurs within the mouth. This usually is associated with bacterial decomposition of the food, secretion and epithelium, resulting in stomatitis with its various complications of "muddy gums," papules, ulcers, and blacktongue. The latter is not a disease with a specific cause, as it is only a symptom which may develop from many causes. Goldberger, Wheeler and Rogers[1] were able to produce the so-called blacktongue symptom by feeding a ration composed of cornmeal, lard, leached casein, cod liver oil and a salt mixture. Blacktongue has been discussed considerably by workers in nutrition, who are principally chemists. They can produce an enteritis and the accompanying stomatitis, to which the name "blacktongue" was given years ago, by feeding the above ration or other rations which are deficient in the vitamin B complex, referred to as vitamin G, and they can relieve this condition by feeding nicotinic acid. It is unfortunate that they know little about pathology; otherwise they would realize that stomatitis is a symptom of enteritis and that it has many other causes. Furthermore, as most dogs get a sufficient amount of meat, which is rich in vitamin G, it is evident that we shall have to look elsewhere for most of the causes of stomatitis and its parent, enteritis. Only those cases of enteritis caused by vitamin G deficiency will be relieved by nicotinic acid.

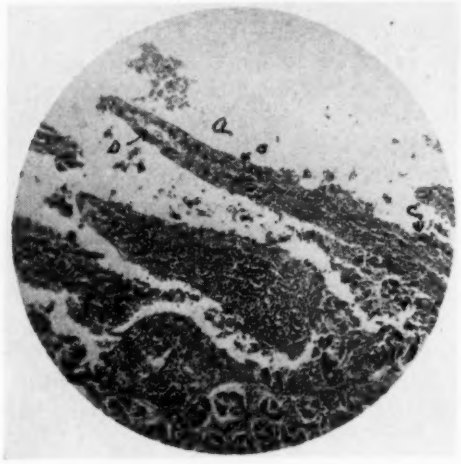
Skin Disturbances Associated with Enteritis

The skin shows the effect of enteritis, as the toxins absorbed from the intestinal tract cause passive congestion and disturbed nutrition. This results in dermatitis, which is characterized by unthrifty hair coat, dryness of the skin associated with degeneration and proliferation of the epithelium, or as a moist eczema, and suppurative dermatitis. Many names are applied to the various manifestations of these disturbances. Also, this condition predisposes the growth of demodectic and sarcoptic mange mites, should any be present. These skin conditions may be confused with allergic reactions. Whitney,[2] who has studied many dogs in his genetic experiments, states that he has never seen allergic reactions. Pomeroy[3] and Burns[4] indicate that dogs may be allergic. In some purebred dogs there is a tendency toward

the development of hard, rough epithelium, or corns, on the pads of the feet. This condition is greatly aggravated by enteritis.

CASES OF CHRONIC BRONCHITIS TRACED TO CHRONIC ENTERITIS

The cause of chronic bronchitis in some dogs can be traced to chronic enteritis. Through passive congestion and accompanying lowered resistance, bacteria within the bronchi multiply. This results in a chronic inflammation and cough. There are other



Cross section of small intestine.

a) Villus, showing b) denuded area, c) epithelium still intact, and d) dilated blood vessel.

times when the cough of puppies and possibly of older dogs is due to the migration of the ascarid larva in its life circuit.

EFFECT OF THE DISEASE ON THE CENTRAL NERVOUS SYSTEM

Disturbances of the central nervous system are not uncommon in dogs affected with enteritis. Some of the convulsions of puppies and even of older dogs, also the posterior paralysis of aged dogs, may be a manifestation of intoxication from the intestinal tract. Many bacteria enter the blood vessels of the intestine in its denuded state, whence they are carried to remote parts of the body. If they are pathogenic, their multiplication may result in abscesses. Under these conditions, just prior to the death of an animal, large numbers of saprophytic bacteria also are disseminated. This accounts for the rapid decomposition of the carcass of animals with severe enteritis. Racoff[5] found small worms within the kidneys of dogs not as yet identified, probably ascarid larvae. This type of lesion has been described and confused with purulent foci.

EFFECT OF ANESTHETICS ON ENTERITIS-AFFECTED DOGS

Enteritis with its associated intoxications is responsible for serious results following the use of anesthetics. As the tissues are intoxicated, they are less capable of rapid absorption of the drugs administered; consequently, larger quantities than under normal circumstances are necessary to bring about the desired effect. Also, the drug that is administered will be eliminated much more slowly by the tissues. This combination of conditions may result in a fatality, in what would normally seem to have been a minor operation.

MICROSCOPIC PATHOLOGY

The microscopic picture of the mucous membrane of the intestine in a state of hemorrhagic enteritis, which is frequently encountered with the severe cases of stomatitis, shows no marked changes from those described in the more severe catarrhal inflammations, except the presence of large amounts of red blood corpuscles which have passed out through the wall of the blood vessels and can be seen free within the intestine. This indicates that the irritant has been more intense; consequently, the exudate contains red corpuscles, as well as plasma and white corpuscles. Such cases are apt to be in a state of purpura.

TREATMENT

It may be said that, with given causes, living tissues are bound to react in a defensive manner and the result is dependent upon the activity of the causative factor and the resistance of the tissue. The treatment, then, resolves itself into removing or

Relationship of Ruptured Yolk to Fowl Paralysis*

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THE TERMS "ruptured yolk" and "fowl paralysis" are being used in their broader aspect. The term "ruptured yolk" is meant principally to include yolk material. However, in the following report, parts of eggs other than albumin retained in the abdominal cavity are included. The yolk may be semi-liquid, pasty or semi-solid, and in quite variable amounts.

In using the term "fowl paralysis," the writer is guided by the name used by the federal regional poultry research laboratory to include not only birds with neurolymphomatosis but lymphocytoma, and leucosis with its many manifestations.

For the past three years we have experienced a heavy loss of pullets and hens from ruptured yolk and fowl paralysis. A study has been made of these two diseases because of their economic importance and because of the lack of agreement of research workers as regards the etiology of ruptured yolk.

The economic loss to the poultry industry from ruptured yolk and other reproductive disturbances is large. The condition is widespread as evidenced by mortality reports from the experiment stations and egg-laying contests. The number of deaths from reproductive disturbances ranks second to fowl paralysis, according to many poultry-disease reports made in recent years.

There are but few reports dealing with the subject of ruptured yolk and its cause. In a review of the available literature Thompson and Dodson[1] described as "peritonitis" a condition where whole or broken yolks fall into the abdominal cavity. The symptoms and lesions they ascribed to the toxic effects of this material or to the mechanical pressure upon the organs by the yolks, or gas from the yolks. Davis[2] reported the isolation of three strains of *Pasteurella avicida* from ruptured yolk cases, which cultures were fatal when injected subcutaneously or into the wattles of cockerels. Eight other strains failed to produce death. Bushnell and Brandly[3] recognized the condition as an economic factor and suggested a feed less rich in protein and concentrates and the lowering of perches. They recognized symptoms of fowl cholera and isolated *P. avicida* from some cases.

Beach and Freeborn[4] described the disease as one affecting particularly pullets, which die during periods of heavy egg production, with older fowls affected occasionally. The manner of its occurrence and the autopsy findings suggest that it may be a result of feeding a ration that is too stimulating, both as regards growth and egg production.

In many cases they found that fowl-cholera or fowl-typhoid germs could be demonstrated. The organisms found are often of such low virulence that disease is not readily produced when they are injected in, or fed to, healthy fowls.

Buckley, Bunyea, and Cram[5] described a peritonitis caused by the internal rupture of infected egg yolks as a variation of an inflammatory condition of the oviduct. *Salmonella pullorum* was suggested as one of the causative agents.

Hoffman (1933) examined field cases from 87 flocks and isolated *P. avicida* from

*From the West Virginia Experiment Station; presented before the Section on Poultry at the 76th annual meeting of the AVMA, Memphis, Tenn., August 28 to September 1, 1939. The experimental data presented in this paper are the results of research by J. H. Rietz, E. T. Wightman, T. B. Clark, and the author.

(*Continued from preceding page*)

neutralizing the cause and fortifying the tissue.

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[1]Goldberger *et al:* U. S. Pub. Health Rpts., xl, p. 300.
[2]Whitney, L. F.: Amer. Ken. Gaz., lv (1933).
[3]Pomeroy, B. S.: Cornell Vet., xxiv (1934), p. 335.
[4]Burns, P. W.: Jour. AVMA, lxxxiii (1933), n.s. 37 (5), p. 627.
[5]Racoff: Diseases of the Kidney. Thesis for M.S. degree (The Ohio State University, 1938).

48.2 per cent. *Shigella gallinarum* and *Salmonella pullorum* were isolated from a few cases. In 24 per cent of the cases bacterial infections were not identified. Cultures injected intraperitoneally and intramuscularly proved pathogenic. Intranasal and intraesophageal injections killed one bird out of eight. Cultures placed in drinking water for two birds failed to produce the infection. Yolk material from diseased birds was injected intraperitoneally into eleven birds. Of these, nine developed fowl cholera.

Some investigators mention the presence of yellowish flakes of exudate in the abdominal cavity. They claim that it may be found attached to the serous membranes or free in the abdominal cavity, as one of the postmortem findings of fowl cholera.

In an attempt to determine the etiological agent or agents responsible for these reproductive losses, a limited study has been made of the etiological agents which it had been reported would cause ruptured yolks.

Many of us have had the opinion that the presence of egg yolk free in the body cavity would invariably lead to autointoxication and death. However, the introduction of yolks with the vitelline membrane unbroken, placed in the abdominal cavity of 14 birds through an incision, produced little ill effect, except for two birds which died as a result of the operation. In 1931, Hoffman reported the intraperitoneal injection of a yolk into each of ten healthy pullets. None of the ten birds developed symptoms during the period of observation, and several of them continued to produce eggs regularly.

The whole yolks or parts of yolks failed to produce sufficient mechanical pressure on the viscera to result in any permanent disturbance. One can readily see, however, that an egg concretion may become so large or be so located as to cause a disturbance in the normal physiological activity of a bird. Postmortem examinations at our station fail to indicate that gas production is abundant following cases of ruptured yolk.

Since yolks or portions of yolks may be introduced into the body cavity of birds without causing clinical symptoms or death, it would appear that yolks ruptured by birds' flying from high perches are not an important factor in causing this condition. We also might expect a breed difference if this were true. As a matter of fact, our experimental flock, composed of 95 Rhode Island Reds and 500 White Leghorns, shows the percentage of loss from ruptured yolks alone or associated with fowl paralysis to be almost identical. It is true that this is too small a number of birds to be conclusive. However, reports from other investigators fail to show a higher incidence of ruptured yolks among heavy breeds.

No experimental work has been conducted to determine the etiological significance of *P. avicida, Sh. gallinarum, S. pullorum,* coli, streptococci or staphylococci. That one or more of these organisms may be present is not questioned.

We are inclinded to agree with Beach and Freeborn,[4] who state:

> The germs (fowl cholera and fowl typhoid) are often of such low virulence that disease is not readily produced when they are injected in, or fed to, healthy fowls, and the part they take in the causation of the condition is not fully understood. There can be no doubt, however, that when present, such germs contribute toward causing death of the affected fowls.

In speaking more specifically of the two flocks with which we have been working, we have not diagnosed a case of fowl cholera since this study was undertaken. Edema of the wattles is a condition which is rarely seen in West Virginia poultry flocks.

Pullorum disease has been reported as a cause of salpingitis. Also, many cases of peritonitis caused by the rupture of infected egg yolks may be variations of this disease. It is common knowledge that *S. pullorum* infection may result in a diseased condition of the ovary. However, the two flocks in which we have been observing a high incidence of ruptured yolks are not infected with pullorum disease. Both are eligible for a U. S. pullorum-clean rating.

It often has been suggested that feeding a high protein ration, resulting in rapid growth and heavy egg production, is a factor contributing to the occurrence of ruptured yolk. To dispute this would seem unwise at this time. With the strain of high

egg production, it seems plausible that we may reduce the resistance of birds to certain diseases. It is thought that feeding a high-protein ration to other domestic animals—particularly the dairy cow—may decrease the resistance to diseases.

In 1937, Lubbehusen and Beach made a study of adult poultry mortality of noninfectious origin. Autopsies were made on 3,001 birds comprising four age groups hatched during 1933 to 1936, inclusive, and designated as H, J, K and L series, respectively. It was observed that during the first six months of the pullet production year visceral lymphomatosis was the dominant lesion contributing to mortality and the development of culls. The incidence of these lesions increased from 21.6 per cent in the H series to 52.5 per cent in the L series. The H, J and K birds suffered the greatest mortality, during the second six-month period of the pullet laying year. The greater proportion of this mortality and of the incidence of culls during this period was due to disorders of the reproductive organs, which continued to predominate during the later age periods up to 3 years.

The fact that the pullet mortality was highest during the second six-month period as a result of reproductive disturbances would tend to indicate that reproductive disorders may not be directly associated with early maturity or forced egg production, during the first part of the pullet laying year, as is commonly believed by poultrymen. They may be a contributory factor, however.

An increase in the incidence of ruptured yolk may be observed, yet there may be no change in the protein content of the ration. This is shown by mortality reports from state egg-laying contests. They attempt to provide the optimum amount of protein at all times to stimulate egg production. The contests have shown a slight upward trend in production from year to year, yet the protein content of the contest rations has remained at approximately the same level. The ability of poultrymen to breed, rear and select contest birds has no doubt played an important part in maintaining production at its present level with a tendency for a slight increase.

Some interesting observations have been made in a project started at our station in 1936 to study low and normal protein diets in relation to mortality and fecundity of White Leghorns.

Visit the National Capital in August

The annex to the Library of Congress is one of the newest and most imposing buildings in Washington, D. C.

Table I shows pen 1-A, which consisted of 100 White Leghorn pullets receiving 13.5 per cent protein in their ration, and pen 1-B, consisting of 100 birds receiving 18.5 per cent protein (these birds were kept for two years). Slight differences are noted in the egg weight, egg production and mortality for the first year. The second year 1-A shows a mortality of 42.3 per cent while that of 1-B is 36.4 per cent.

Pen 2-A, consisting of 55 birds receiving the low-protein diet, shows a mortality the first laying year of 41.1 per cent, and 2-B, with 55 birds receiving 18.5 per cent protein, has a mortality of 33.3 per cent.

Up to August, pen 3-A (13.5% protein) and pen 3-B (18.5% protein), consisting of 155 birds, showed a mortality of 29.3 per cent and 15.3 per cent, respectively.

It is observed that losses from ruptured yolk alone and cases associated with fowl paralysis in pen 3-A and pen 3-B were 10.9 per cent and 1.9 per cent, respectively. This would indicate that the higher protein content of the normal ration did not affect the incidence of ruptured yolk. The low protein diet showed a loss of 17 birds. Twelve birds died as a result of fowl paralysis with ruptured yolk.

Postmortem findings failed to show the presence of any nutritional deficiency as being directly responsible for the higher losses in the A pens. The low protein diet can be criticized on the ground that it is not adequate for normal chick growth. Apparently it is adequate for maintenance and results in fairly good egg production. The production of the A pens is only slightly less than the production of the B pens.

Another project in which we have studied the selection of breeders in relation to longevity of progeny has given some interesting results, which suggest a relationship between ruptured yolk and fowl paralysis.

Work on this project was started in the fall of 1938 with 500 White Leghorn pullets. They are the progeny of ten males and 62 females. Complete pedigrees, trapnest records and cause of mortality are kept.

Table II gives the parentage, number of progeny, number of losses, cause of death, and percentage of loss from the ten different matings.

There is a wide variation in the percentage of losses from the different matings. The greatest loss occurred with male 7-B. Of twelve pullets from a mating with two hens, he lost 5, or 41.6 per cent, of his progeny. It will be noticed that both hens showed progeny with fowl paralysis. Three birds died with this disease and one case was associated with ruptured yolk.

The lowest mortality is found with male 14, where seven birds died out of 69 pullets, or 10.1 per cent. Only one had fowl paralysis and this individual also showed the presence of ruptured yolk in the abdominal cavity.

It can be seen that the principal cause of death in this experimental flock was fowl paralysis. At the time these data were compiled, approximately 9 months of the pullet laying year had elapsed. The mortality of the flock was 20.8 per cent. The losses from fowl paralysis or fowl paralysis associated with ruptured yolk accounted for 11.2 per cent of the deaths in the flock. Seven per cent were due to fowl paralysis alone, while 4.2 per cent showed the two condi-

TABLE I—Egg production, egg weight, body weight and mortality of birds fed 13.5 per cent (A pens) and 18.5 per cent (B pens) of protein over a period of three years.

Pen	Production		Egg Weight		Body Weight		Mortality	
	1 Yr.	2nd Yr.	1 Yr.	2nd Yr.	1 Yr.	2nd Yr.	1 Yr.	2nd Yr.
1-A	49.2	39.6	57.6	60.8	3.48	3.70	29.8	42.3
1-B	53.9	40.8	58.0	61.3	3.62	3.84	32.7	36.4
2-A	46.2	——	55.9	——	3.31	——	41.1	——
2-B	57.8	——	55.5	——	3.31	——	33.3	——
3-A	Incomplete						29.3	
3-B	Incomplete						15.3	

TABLE II—Parentage, number of progeny, number of losses, cause of death, and percentage of loss from ten different matings.

Male No.	Hen No.	Cause of Death	Birds	Loss	Per Cent Loss
7A	D 26	Atrophy 1, H. 1	9	2	
	H 77	PO1, H1, FP2	14	4	
	H 164	FP1, FPRY1	7	2	
	H 174	FPRY2, ND1, RY1, FP2, Per. 1	17	7	
	H 267	FPRY2, FP2	15	4	30.6
7B	H 97	FP1, roup 1	7	2	
	H 881	FP2, FPRY1	5	3	41.6
8	G 98	FP1	7	1	
	G 153	FPRY1	6	1	
	H 88	Prolapse 1	13	1	
	H 224	FP2	9	2	
	H 846	Salp. 1	5	1	15.0
9	E 240	N1, H1	10	2	
	E 258	RY2	12	2	
	G 334	FPRY 1	6	1	
	H 47	FP1	2	1	
	H 111	FP1, FPRY1	13	2	
	H 463		8	0	
	H 465		2	0	
	H 858	FPRY1	6	1	15.2
12A	E 356	FP1	1	1	
	H 110	Enteritis 1, FPRY1	6	2	
	H 310	FPRY2, H1, tapes 2	16	5	
	H 353	Iritis 1	3	1	34.6
12B	D 406		2	0	
	E 98		4	0	
	G 164		8	0	
	H 180	FP2, Con. 1	8	3	
	H 216	FP1, RY1, FPRY1, NA2	13	5	
	H 525		8	0	18.6
13	F 288	N1, ND1, atrophy 1	12	3	
	G 36	FPRY1, RY2	10	3	
	G 271	FP1	3	1	
	H 117	Decomposed 1	11	1	
	H 260	FPRY2, FP3, NA2, RY1	17	8	
	H 265	FPRY2, FP3, Per. 1	11	6	
	H 522	FP2	4	2	
	H 571		4	0	33.3
14	H 15	NA1	10	1	
	H 28	Salp. and Per. 1	12	1	
	H 53		7	0	
	H 163	Enteritis 1, NA2	7	3	
	H 531		15	0	
	H 823		11	0	
	H 825	FD of liver 1	3	1	
	H 870	FPRY 1	4	1	10.1
15	E 336	RY1	6	1	
	H 51	FPRY1	9	1	
	H 93	FP1, N1	15	2	
	H 187		1	0	
	H 255	RY1	6	1	
	H 471	FP4, atrophy 1	11	5	
	H 819		6	0	
	H 859		4	0	17.2
16	E 118		1	0	
	E 257	PO1, roup 1	8	2	
	F 300	Iritis 1	11	1	
	H 44		10	0	
	H 48		7	0	
	H 211	FP1, H1	8	2	
	H 864		6	0	
	H 874	FP1, FPRY1	8	2	11.8

H = Hemorrhage.
N = Nephritis.
Con = Constipated.
FD of liver = Fatty degeneration of liver.
ND = No diagnosis.
NA = No autopsy.
PO = Pick out.
RY = Ruptured yolk.
FP = Fowl paralysis.
FPRY = Fowl paralysis and ruptured yolk.
Per. = Peritonitis.
Salp. = Salpingitis.

tions to be associated. Only 1.8 per cent of the losses were due to ruptured yolk alone.

In going over the postmortem records we found that many of the birds which died with fowl paralysis, without yolk material in the body cavity, had not laid recently. Of the group dying with fowl paralysis, two birds were brought to the laboratory dead, but the ovary was functioning; 13 were dead with the ovary dormant; eight were alive and the ovary dormant, while none was alive and laying. The group diagnosed as fowl-paralysis cases with ruptured yolk showed three dead in which the ovaries were functioning, three dead with the ovary dormant, and one alive and laying, while there was none alive not laying.

Unfortunately, we did not keep this information on all birds; therefore, our records are not complete. Upon determining the average number of days from the date of the last egg until a bird was brought to the laboratory for postmortem examination, we find the fowl paralysis group was 40.4 days; fowl paralysis with ruptured yolk, 16.6 days; and ruptured yolk alone, 7.6 days. Five out of the nine birds which died with ruptured yolk died in four days or less. Two of the remaining four birds also showed a condition spoken of as internal layer, which often represents a more chronic condition.

It is not uncommon to find birds in heavy production, when affected with an acute disease, to show ruptured yolks. Therefore, fowl paralysis is not the only etiological agent responsible for this condition. Undoubtedly, the presence of *S. pullorum, Sh. gallinarum,* coli, *P. avicida* and other organisms tends to hasten the death of birds in this condition, and may be the primary etiological agent, particularly in acute cases.

A statistical analysis of table II is highly suggestive of a relationship between ruptured yolk and fowl paralysis. Some statistical evidence indicates that this is true. We can logically assume that birds not in production (ovary dormant) will not show ruptured yolks. If we can logically deduct those birds with fowl paralysis and without ruptured yolks which did not lay for three weeks or more prior to autopsy, we could expect eleven birds with both fowl paralysis and ruptured yolk if these conditions were independent of each other. In other words, we could expect eleven birds to show the two conditions by chance. Actually, there were double this number.

The coefficient of association of these two conditions would be .85 based on 1. as showing complete association.

SUMMARY

1) Ruptured yolk does not represent a separate disease entity.

2) In a flock of 500 birds the mortality for the ten pens the first nine months was 20.8 per cent.

3) The losses from fowl paralysis or fowl paralysis associated with ruptured yolk accounted for 11.2 per cent of the deaths. Seven per cent were due to fowl paralysis and 4.2 per cent showed the two conditions present in the same bird. Only 1.8 per cent of the birds showed ruptured yolk alone.

4) By chance we could expect eleven birds to show the two conditions in the same individual (after deducting those birds with fowl paralysis and without ruptured yolk which did not lay for three or more weeks prior to autopsy). Actually, there were double the number we could expect by chance if they were independent of each other.

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In the army meat-inspection service, a broiler is defined as a fowl (chicken) of either sex, eight to twelve weeks old and weighing not more than 2½ lb.—*Morse.*

Coccidia and Coccidiosis in Feeder Lambs*

By A. W. DEEM, D.V.M., and FRANK THORP, JR., D.V.M.
Fort Collins, Colo.

STUDIES of the various factors influencing coccidiosis have been continued at the Colorado Experiment Station during 1938-39. Previous investigation[1] has shown that coccidial counts in composite fecal samples of lambs in the feedlot rise for about one month, remain stationary for a period of one to three weeks, then decline rather rapidly until only a few oöcysts can be found at the termination of the feeding period.

During 1938, an experiment station project was initiated to determine the influence of the diet upon the formation of urinary calculi in feedlot lambs. The experimental procedure in this project necessitated the confinement of a part of the lambs at regular intervals throughout the feeding period of 120 days. This made it possible to secure from individual lambs fecal samples which were examined for coccidia.

The lambs were purchased in New Mexico and arrived in Fort Collins on November 7, 1938. During the first week after arrival the lambs were all kept together and all received the same ration of alfalfa hay and water. They were then divided into seven groups, with 96 animals in each group, and an effort was made to have the groups as nearly uniform as possible on the basis of size and physical condition. A different ration was then fed to each group. Some of the results are shown in table I.

Seven lambs in each of the seven lots were confined individually at 21-day intervals for a period of three days, which made it possible to collect and examine the feces of each of 49 lambs every three weeks.

Since a direct quantitative count is satisfactory only when comparatively large numbers of coccidia are present, the following concentration method was used for all samples so that the results would be comparable:

Suspend 10 Gm. of feces in 100 cc. water; strain through wire mesh.

Take 7.5 cc. of above and 7.5 cc. Sheather's[2] sugar solution in 15-cc. centrifuge tube.

Mix and centrifuge for ten minutes at 1,000 r.p.m.

Take .03 cc. from the surface of the tube with a standard pullorum-testing blood loop.

Examine on slide with cover glass. Count all coccidia or, if too numerous, count several fields and compute the total.

The charts of the individual lambs as well as the totals of the groups examined present, in general, the picture which has been noted in previous years. There was a rather rapid increase in the numbers of coccidia for the first month, then a decline, either rapid or gradual, for the next three months, after which time either very few or no coccidia could be found. (Table II gives the coccidial counts of seven of the 49 lambs in which individual fecal examinations were made. With some variation all show the same general curve.)

In a few of the lambs the number of coccidia did not reach the peak until the second month, and then declined rapidly. In a significant number of the lambs examined, a second rise in numbers of coccidia was noted during the third or fourth month, again followed by a decline. It is believed that this might be due to another species of coccidia following the original infection.

It was noted that in some of the exceedingly high counts of coccidia during the first month of the feeding period, *Eimeria parva* either predominated or were found alone and that, later, *E. arloingi* were found in greater numbers in the same lambs.

While some exceedingly high counts were obtained in which *E. parva* predominated or were the only organisms found, no cases of coccidial dysentery developed for which *E. parva* seemed to be responsible. *E.*

*From the Colorado Experiment Station.

TABLE I—Results of feeding different rations to seven lots of lambs.*

	No. of Lambs	Scouring	Dead of Coccidiosis	Culls	Remarks
Lot 1 Alfalfa Yellow corn Molasses	96	14	1	4	Fed alfalfa for roughage
Lot 2 Alfalfa Yellow corn	96	10	3	2	
Lot 3 Alfalfa Yellow corn Bran	96	14	6	1	
Totals	288	38 (13.2%)	10 (3.4%)	7 (2.4%)	5.8% dead or culls
Lot 4 Beet tops Yellow corn Molasses Straw	96	23 25%	3 3.1%	3 3.1%	6.2% dead or culls
Lot 5 Cane Yellow corn Bran	96	9	0	2	
Lot 6 Cane White corn	96	13	1	0	Fed cane hay for roughage
Lot 7 Cane Yellow corn Molasses	96	14	2	0	
Totals	288	36 12.5%	3 1+%	2 0.7%	1.7% dead or culls

*All lots had access to salt.

arloingi was the predominating organism in all clinical cases of coccidiosis.

Coccidial dysentery developed in lambs in each of the seven groups, the first cases being noted 16 days after the arrival of the lambs. Some lambs in each lot developed clinical coccidiosis, but apparently both the incidence and severity of the infection were influenced by the rations fed to the different groups. (See table I.)

It may be noted that, in addition to the actual death loss, twelve culls were removed, ten of them from the first four lots. These lambs were so severely affected with coccidiosis that they did not recover completely. They were sorted out and fed separately, but they never developed into good lambs and might well have been added to the coccidiosis mortality list.

The incidence of clinical coccidiosis as evidenced by severe scouring was much the greatest in the pen of lambs which received beet tops and straw for roughage, but the mortality does not differ greatly from that of the groups being fed alfalfa. There was a significant difference in the mortality and the number of culls in the groups receiving cane hay as compared with the mortality of those fed alfalfa or beet tops. It is believed that cane hay fed for the first month is not as great a change from the previous range diet and is less likely to cause diges-

TABLE II—Coccidial counts of seven of 49 lambs in which individual fecal examinations were made.

LAMB NO.	11-17-38	12-8-38	12-29-38	1-19-39	2-9-39	3-3-39
1	670	5,730	127	176	8	4
2	17,136	29,925	43	24	110	99
3	6,932	1,001	855	30	38	0
4	27	1,540	2,370	8	0	6
5	1,093	627	22	403	323	22
6	126	814	120	0	210	15
7	1,008	7	7	8	7	8
Totals	26,992	39,644	3,544	649	696	154

tive disturbances and resultant lowered resistance to coccidial infection.

SUMMARY

Fecal examinations from individual lambs show, in general, a marked increase in the numbers of coccidia during the first month in the feedlot; then the number declines, either rapidly or gradually, for two or three months, after which few coccidia can be found.

Some evidence is presented which indicates that the ration fed is a factor in the cause of clinical coccidiosis and has a definite influence on the mortality.

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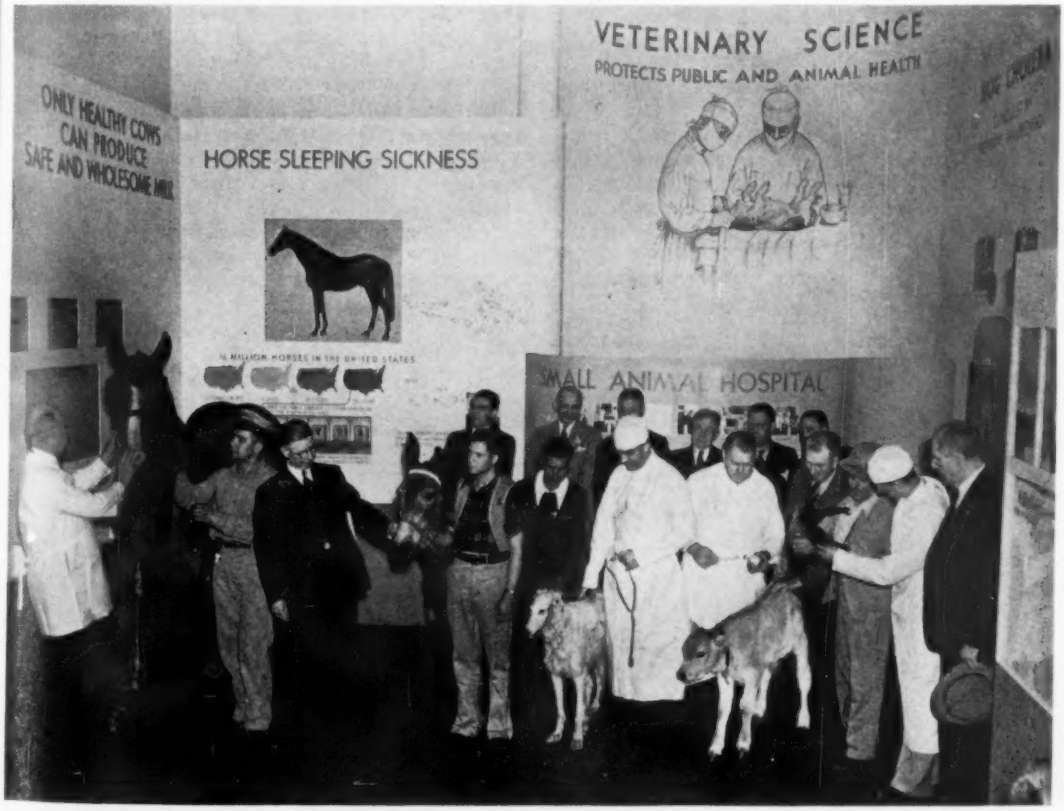
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CLINICAL DATA

Possible Common Genetic Factor in Acanthosis Nigricans and Cancer: An Observation

By CHARLES E. FLETCHER, D.V.M.

New York, N. Y.

CLINICAL CANCER has been observed to be associated with acanthosis nigricans in humans,[1] and the following case, which is taken *verbatim* from a report by Curth and Slanetz[2] in *The American Journal of Cancer*, would indicate that this association also occurs in dogs.

REPORT OF CASE

Dolly, a female German Shepherd with some trace of Collie blood, was first seen in November 1936, at which time she was 14 years old.

History.—Dark pigmentation on the dog's flanks was first noticed when she was 2 years old, on the occasion of her first clipping. The discoloration gradually spread over large areas of the body. At the age of 10 years the animal aborted. At about the same time two large, soft tumors became palpable on the left flank. These had not increased in size. In the past two years the skin had become progressively darker and rougher, and a disagreeable odor had developed.

Examination. — Symmetrically distributed over large parts of the body, most markedly over the body folds and on the hind legs but also on the flanks and back, were many poorly circumscribed areas, varying in diameter from less than 1 cm. (.39 in.) to 7 or 8 cm. (2.7 or 3.1 in.) and showing black, thickened, rough, hyperkeratotic skin (fig. 1). The hair had not come off to any noticeable degree in these areas. The abdomen and nipples showed diffuse blackening and milk thickening. The anus also was involved. The odor of the animal was almost unbearable. On the left flank two smooth, movable tumors could be felt in the subcutaneous tissues.

Histological Examination. — A biopsy was taken from the border of the lesion on the flank (November 1936). At the right side of the specimen the epidermis was thin, consisting of two to four layers of rete cells and a thin layer of granular cells, over which were many layers

Fig. 1. Skin changes on left side of body.

(*Cut courtesy The American Journal of Cancer.*)

of horn cells. A moderate amount of pigment was present. The papillae were hardly visible. At the left side the epidermis showed long, thick rete pegs extending down into the cutis. The papillae were long and the tips were covered with a malpighian layer of about six cells. The granular layer was absent in spots, and the surface of all the hypertrophied epidermis was covered by a thick, rather compact layer of horn cells containing many vesicular and rod-shaped nuclei. There was dense pigment in the basal layer and in processes of dendritic cells extending up into the rete. Some of the rete cells also contained much pigment, and there was yellow granular pigment in the parakeratotic scales. A few mitoses were visible in the basal layer.

The papillary layer showed some edema, a slight infiltration with round cells, and some large chromatophores. In the deeper corium, under both normal and thickened epidermis, were numerous cystic hair follicles filled with horny scales surrounding each hair.

The marked epidermal hypertrophy, hyperkeratosis and pigmentation make this lesion similar to acanthosis nigricans in man. The parakeratosis and the dilatation of the hair follicles may be due to a difference in the reactivity of canine skin. . .

Diagnosis.—Acanthosis nigricans; tumors of flank.

Course (May 1937).—The skin condition was slowly progressive. The bad odor increased. The dog appeared listless, was without appetite and lost considerable weight. On June 4, she was killed.

Autopsy (June 5).—Externally the coat appeared shaggy and several areas of black, hyperkeratotic changes were present on the head near the nose and in other parts of the body. The eyes showed a thick mucopurulent discharge and conjunctivitis. The two nonadherent peach-shaped subcutaneous tumors on the left flank previously noted showed little change. One measured approximately 10 by 5 cm. (3.9 by 1.95 in.) and the other approximately 4 by 2 cm. (1.57 by .79 in.). Although there was some loss of weight, the musculature was essentially unchanged. Except for the lungs and the liver the gross pathological changes were slight.

Fig. 2. Cancer nodules in the liver.

(Cut courtesy The American Journal of Cancer.)

The lungs showed areas of congestion and edema with emphysematous patches in the lower lobes. In the liver numerous firm whitish nodules, varying in diameter from 1 to 25 mm., were present, which on section yielded no fluid and gave no evidence of an inflammatory reaction. The gall bladder was somewhat distended. The heart, spleen, pancreas, thyroid and adrenals appeared to be normal. The kidneys were somewhat pale. A thorough examination of the intestine was made. The contents were scanty; no pathological changes were observed and no worms were found on gross examination. There was no evidence of neoplasm except for the multiple nodules in the liver (fig. 2) and the subcutaneous tumors.

Histological Examination.—The specimen of skin examined did not show the diffuse thickening of the epidermis seen on biopsy, but projecting down from the surface epithelium and from the sides of the hair follicles were

numerous processes, some finger-like, some branched, and others club-shaped. The cells stained normally with eosin and showed practically no mitoses. Cells in the basal and adjacent layers showed an extraordinary amount of pigment. These processes were not unlike the elongated rete pegs which separate the enlarged papillae in some human cases. The parakeratotic masses on the surface and distending of the hair follicles were more marked than in the biopsy specimen. One of the plugged follicles contained pus and was surrounded by a small abscess. Edema and lymphocytic infiltration were present throughout the papillary layer.

The adrenals appeared normal.

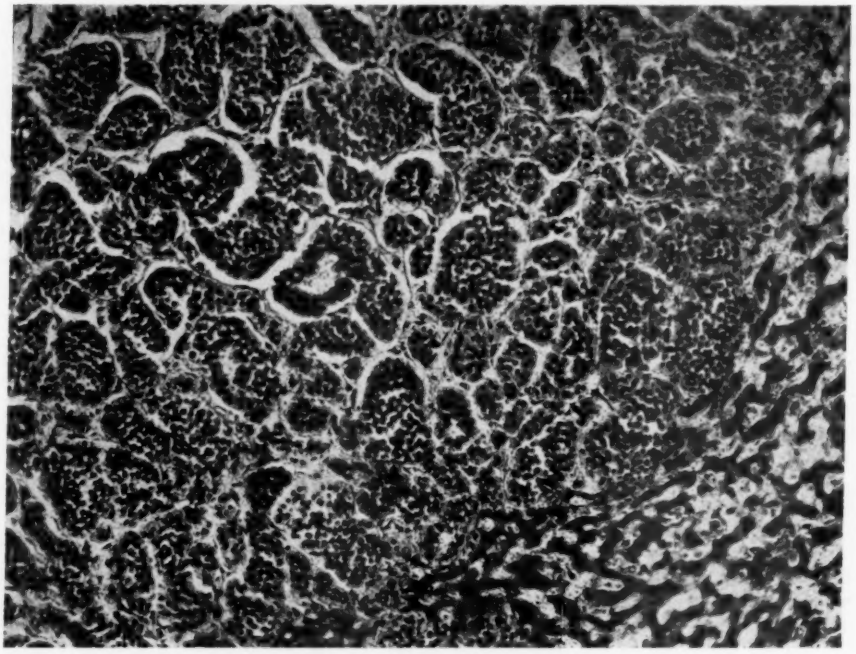

Fig. 3. Cancer of the liver. Note normal liver tissue at extreme right.

(Cut courtesy The American Journal of Cancer.)

The ovaries showed some evidence of fibrosis.

The subcutaneous tumor was a lipoma.

Sections of the lung showed diffuse edema and small patches of anthracosis.

Sections of the kidney showed congestion and cloudy swelling tubules. There was some exudation of serum about the glomerular tufts.

Sections of the liver (fig. 3) showed numerous small and large neoplastic masses. The smaller consisted of cords of one or two rows of polygonal cells lying in a dense fibrous stroma, often adjacent to a portal vein. The tumor cells were smaller than those of the liver parenchyma. Their protoplasm stained densely and was slightly basophilic. The nuclei were small, nearly round, and often eccentric. They stained deeply but showed a distinct wall and some chromatin network. No mitotic figures were seen in the cords. The larger nodules were made up of larger cords and nests of similar cells—often 20 cells in width. Most of them stained densely and evenly but a few were finely vacuolated. The cells were often palisaded at the edge of the cords but formed no true tubules. The nests and cords were separated by a delicate connective tissue network. In Foot-Bielschowsky preparations no reticulum was seen within the groups of epithelial cells.

The tumor cells showed little similarity to those of the liver cords or bile ducts. They resembled, rather, those seen in carcinoids of the appendix. A Fontana stain, however, failed to show any argentaffine granules.

Where the neoplasm adjoined the liver parenchyma, there was no evidence of encapsulation. In a few areas there were accumulations of lymphocytes and plasma cells, but elsewhere no inflammatory reaction was observed.

COMMENT

This was a case of acanthosis nigricans and carcinoma in which the liver was probably the primary seat of origin. While the association in this case may have been a mere coincidence, and while clinical observations in other similar cases have not been supported by histological examinations, the findings of Schindelka[3] and Habacher[4] in dogs and of Curth[1] and Masson and Montgomery[5] in humans seem to support the hypothesis that genetically these two conditions are associated.

After making a diagnosis of acanthosis

Some Observations on the Intravenous Use of Mercurochrome*

By A. A. HUSMAN, D.V.M.

Raleigh, N. Car.

CASE 1

Several years ago I was called to investigate some hog trouble on a farm in the northeastern section of Gates county, N. Car. After I had completed the investigation, the owner asked me to destroy a 6-year-old mare mule suffering with chronic nasal catarrh. He stated that he had made three trips to the nearest practicing veterinarian, 50 miles away, and that the animal was getting worse. His help refused to work the animal any longer because of her foul odor.

After looking the animal over and finding her sound in every respect with the exception of the aforementioned condition, I advised against destroying her and stated that I would like to experiment with her. A 2 per cent solution of mercurochrome was procured and 30 cc. was administered intravenously. Another dose of the same amount was given 48 hours later. The animal showed marked improvement the third day after the first administration and completely recovered in less than two weeks. Six years later the owner reported that the animal had remained in constant good health since that time.

CASE 2

About six years ago, while making a trip through the East at the request of the state veterinarian of North Carolina, I investigated a case in a 10-year-old mule reported by a practitioner as being suspicious of glanders. After making an examination I felt satisfied that this was not a case of glanders, and a laboratory examination confirmed my decision. My conclusion was that the animal had an aggravated case of summer sores. The neck, shoulders, part of the abdominal wall, and limbs were involved.

The owner wanted us to destroy the animal, but I told him that we would like to try out a treatment before doing so. We gave 30 cc. of a 2 per cent solution of mercurochrome intravenously, repeating it in 24 hours and again at the end of 48 hours. The practitioner informed me later that the animal had suffered considerable shock after the third dose but had made a complete recovery in three weeks and had been put back to work.

The following summer the owner noticed a few sores on the neck and fore limbs and called the practitioner, who administered 30 cc. of a 2 per cent solution of mercurochrome and 30 cc. of a 1 per cent solution 48 hours later. The sores disappeared in about nine days and the animal was worked the balance of his years.

CASE 3

That same summer, while checking tuberculosis testing in one of the southern counties, I was at a practitioner's office when an old mule was brought in which had sores all over his body, some oozing serum and many of them showing pus infection. Again, 30 cc. of a 2 per cent mercuro-

*Presented at the annual meeting of the Southern Veterinary Medical Association, Columbia, S. Car., November 9-11, 1939.

(*Continued from preceding page*)

nigricans in cases where this associated condition is not clinically apparent, the writer always gives a poor prognosis, anticipating later clinical manifestations of a glandular malignancy.

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chrome solution was administered intravenously, followed by two doses of a 1 per cent solution at 48-hour intervals. The practitioner reported to me later that this animal had recovered.

CASE 4

About three years ago, while in an isolated section of the East about 60 miles from a practicing veterinarian, I encountered another case of chronic nasal catarrh in a 5-year-old mule. The owner had tried a number of patent medicines and home remedies, with no results. A 2 per cent mercurochrome solution was administered intravenously and the animal recovered.

CASE 5

Last year, while I was conducting the annual tuberculin test at a state-owned institution, the superintendent asked me to look at a pair of young western Percheron mares suffering with strangles. The submaxillary glands had been incised and were still discharging pus. There was a profuse discharge from both nostrils. We obtained a 2 per cent mercurochrome solution and 30 cc. was given to each animal. I did not see the superintendent again until this year, when he told me that the mares recovered ten days after the treatment. These cases occurred in the mountainous section of the state.

CASE 6

In this same area a charitable institution had a 14-year-old gelding that had become very sluggish and exhibited skin eruptions on different parts of his body. Again a 2 per cent mercurochrome solution was administered and, upon my return this year, the manager informed me that the animal's skin cleared up in a short time, that he improved generally and was worked all summer and fall.

CASE 7

I have from time to time told practitioners of these cases and recently a veterinarian in the East told me that he had administered the treatment to a mule suffering with summer sores on which other remedies had been used to no avail. The owner reported to him that the mule had shown such improvement three days after the first treatment that he did not believe it necessary for him to make another call.

COMMENT

It can readily be seen that these observations cover a long period of time, due to the fact that, as an employé of the federal bureau of animal industry, I am not allowed to engage in practice. Therefore, it was necessary for me to conduct the above experiments without neglecting my regular duties and to get my reports from practitioners in cases where they carried out the treatment, or from the owners in the isolated sections. I did not receive reports on three cases.

Puttee Material

To the Editor.—I am sending you a sample given me by a shoe manufacturing concern which tans thousands of horse hides, and would like to have you advise me of the technical name of the part of the derma marked "X." This is the material from which the best puttees are made. I have been told that this is found only in a region over the loins out to the point of the ilium and back almost to the tail.—*J. F. F., Illinois.*

Reply.—The technical name of the layer of skin marked "X" on the specimen you sent is *Tela subcutanea.* At some parts of the body where fat is abundant it is called *Panniculus adiposus,* and in horses or other animals where the skin has voluntary motion the name is *Panniculus carnosus* or *Muscularis cutaneus.*

In common language, this is the subcutaneous layer of the skin, which in horses is very tough along the back.

Selling hogs for slaughtering on the basis of actual carcass value instead of live weight and appearance is among the probable reforms of swine breeding in the future. Hogs grading alike on foot vary from 10 to 14 per cent in carcass value, according to tests made at a large packing plant.

Hyperplasia of Bone Marrow and Osteohematochromatosis in a Yearling Steer*

By G. E. MITCHELL, D.V.M.

Memphis, Tenn.

THOSE who attended the AVMA meeting held in Memphis, Tenn., August 28 to September 1, 1939, will remember seeing a yearling Hereford steer at the cattle clinic that was exhibited because of a supposedly rare condition. The teeth had a decided bluish purple color. There were a number of bare spots on the face, and various places on the body also were devoid of hair. The skin of these bare spots was dry and flaky and was suggestive of a condition due, perhaps, to some feed responsible for photosensitization.

After the meeting, Dr. Branigan, supervising inspector of the South Memphis stockyards, arranged to have the animal taken to those yards so that it could be held under observation until its slaughter at one of the inspected establishments. It was held at the yards until October 16, by which time it had lost some of the unthrifty appearance and had gained some weight. The bluish color of the teeth still persisted and the bare spots remained about the same.

On October 16, the animal was slaughtered at U. S. Inspected Establishment 579 and a careful and detailed postmortem examination was performed which revealed nothing abnormal in any of the organs. In general it had the appearance of a normal carcass. However, the same bluish color was quite apparent in the long bones. The marrow appeared about normal. The cancellated portion of the long bones was very brown. The split vertebrae was dark brown and jelly-like.

Specimens of all tissues and organs were submitted to the Washington pathological laboratory of the Bureau of Animal Industry for examination and diagnosis. A copy of the Washington report follows:

The blood smears forwarded stained poorly and were not satisfactory for diagnostic purposes.

Sections from the bone tissue, in which there was dark coloration of the red marrow, exhibited histological changes, consisting of excessive numbers of lymphocytes, leucocytes, myeloplaxes and red cells, together with absorption of the bone structure, which is typical of hyperplasia of bone marrow. In sections from the osseous tissue showing the brownish coloration, a brownish granular pigment could be seen. This brownish coloration of the bones, which also involved the teeth, is considered typical of the bone condition referred to by Ostertag as "osteohematochromatosis." There were, therefore, apparently two separate conditions involving the bones in this case.

The spleen and kidney contained rather heavy deposits of iron-containing pigment. The liver and kidneys showed a certain amount of parenchymatous degeneration. Other tissues submitted showed little deviation from the normal.

It is apparent there had been a systemic disturbance, toxic or otherwise, in this case, and in view of the two conditions involving the osseous tissue, it is the opinion of this office and also of the meat inspection division that carcasses of this type should be condemned.

Respectfully, L. T. GILTNER
Acting Chief, Pathological Division.

*From the Bureau of Animal Industry, U. S. Department of Agriculture, Memphis, Tenn.

Color Combinations of Hog Crosses

Hogs that are predominantly black with white belts result from crossing Hampshires with Duroc Jerseys, Berkshires, Spotted Poland China or Poland China sows. Crossing the Yorkshire on Poland China, Duroc Jersey, Berkshire or Tamworth results in mostly white pigs with some reddish-tinted or sandy-colored individuals. Red or sandy pigs with black spots result from crossing the Duroc Jersey on the Berkshire or Poland China. The Berkshire-Tamworth cross produces offspring that are dark red with some black spots.

A small amount of perfume can scent many thousand cubic feet of air and not lose weight. "How come?"

SURGERY & OBSTETRICS

Equipment for Artificial Insemination in Cattle

By R. L. ANDERES,* B.S., D.V.M.

Kansas City, Mo.

THE ARTIFICIAL vagina now employed for the collection of bull semen has been largely responsible for the present widespread interest of veterinarians in artificial insemination. This collection instrument has been prepared to meet the requirements for an apparatus which will make possible the collection of a pure, clean sample of the entire ejaculate of the male.

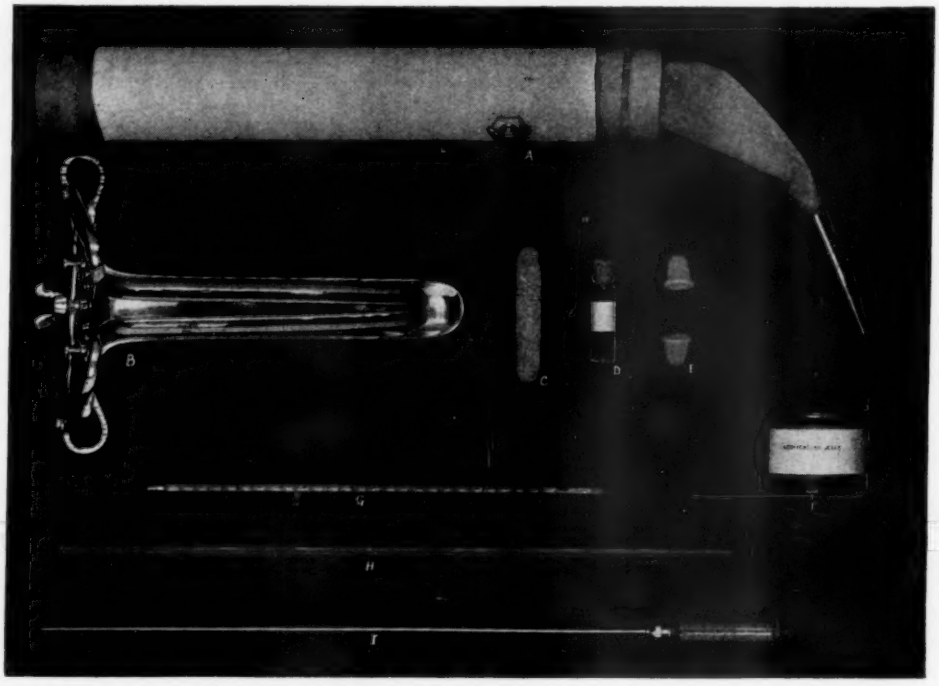


Fig. 1. Equipment for artificial insemination.

The artificial vagina (fig. 1-A) consists of a thin latex rubber inner liner placed inside a heavy, thick-walled, cloth inserted rubber casing. The ends of the inner liner are folded over the outside casing, leaving a space between the two pieces for the addition of hot water so that the entire instrument can be warmed. (Note the metal water connection.) On one end of the tube is stretched a director cone also of latex rubber. This is secured over the end of the tube with a heavy rubber band. On the apex of the cone is fastened a sterile graduate glass vial for the collection of semen. The artificial vagina completely assembled is illustrated in figure 1-A.

Aside from the supply of parts of the artificial vagina, only a few pieces of equip-

*Jensen-Salsbery Laboratories, Inc.

ment are necessary for semen collection. These include a bucket, dipper and funnel for the introduction of hot water into the artificial vagina. A chemical thermometer (fig. 1-G) is necessary for determining the exact temperature inside the instrument. Lubrication jelly (fig. 1-F) or mineral oil should be provided for lubrication, which may be applied with an 18-in. plain glass rod (fig. 1-H). It also is necessary to have tubes for the storage of semen. Ordinary homeopathic vials (fig. 1-D) equipped with labels and paraffin corks should be available. One also must have paper cut in correct sizes and rubber finger cots (fig. 1-E) for providing insulation over the semen vials (fig. 1-C). This precaution is necessary to avoid rapid changes of temperature. Finally, it is necessary to be equipped with a thermos bottle or jug in order to store collected semen specimens. In addition to these incidentals for semen collection it is well to have a good, long-handled brush for cleaning the prepuce and adjacent area of the bull before collection.

Animals to be inseminated should be secured in breeding stocks and the external genitals thoroughly cleaned. This can be done with warm water and a sponge. A heifer speculum (fig. 1-B) may be used, although the plain glass speculum is preferred by some practitioners. For insemination 16-in. glass tubes or a stainless steel insemination tube (fig. 1-I) may be used. Most operators prefer a glass tube attached to a 5-cc. all-glass syringe by means of a short length of rubber tubing and a syringe adapter.

The operator should prepare himself with clean, white clothing, an obstetrical sleeve and surgeon's glove and a diagnostic head lamp. He also should have available plenty of fresh water and clean towels.

This equipment lists all of the necessary items for the routine work of artificial insemination in cattle. If it is desired to dilute semen so that more females may be serviced by a single cover, it may be desirable to employ semen-diluting fluids, of which two kinds are available and in use.

A copper carrying case for insemination tubes having a capacity of two dozen tubes is a handy addition to the kit. A carrying case that will accommodate all equipment is also available.

Bang's Disease in the Virgin Islands of the United States

The very low percentage of Bang's infection in cattle in the Virgin Islands is believed to be due to dry weather the year around and an excess amount of sunlight.

The data below are figures taken from my records in connection with official work in St. Croix, St. Thomas and St. John, Virgin Islands.

As of September 1939, there were 7,009 head of cattle in St. Croix and 1,323 of that number were tested for Bang's disease from that date to May 1, 1940. The School of Tropical Medicine, San Juan, Puerto Rico, made 200 of the blood tests and all 200 were negative. Our laboratory in St. Croix ran the remainder of the tests (1,123), in which were found three positives and two suspects, making the percentage of infection in animals tested in St. Croix .37 per cent.

St. Thomas and St. John are grouped as one, as the two islands come under one municipality. On September 1, 1939, there were 3,223 head of cattle on these islands. During the past eight months 175 were tested, and of that number one suspect and one positive were found, making the percentage of infection in St. Thomas and St. John among tested cattle 1.14 per cent. The St. Croix laboratory also ran these blood tests.

In the United States Virgin Islands (St. Croix, St. Thomas and St. John) there are 10,232 head of cattle, of which 1,498 head have been tested for Bang's disease since September 1, 1939, with 1,491 negatives, four reactors and three suspects, making the percentage of negatives 99.53.—*Gordon C. Kendall, D.V.M., Christiansted, St. Croix, Virgin Islands.*

The weather is the most widely discussed of natural phenomena. It concerns atmospheric temperature and humidity, the two main governing factors of life.

The Use of Rubber Tubing in Closing Surgical Wounds of the Abdomen

By ANDREW C. MERRICK, D.V.M.

Brookfield, Ill.

NUMEROUS technics are employed in closing abdominal wounds incident to surgery. Some surgeons depend upon three rows of sutures: One in the peritoneum, another through the muscles and a third in the skin. Others use only two rows: One which penetrates the peritoneum and muscles and the second through the skin.

In our practice we use a single row to bring the peritoneum, muscles and skin into apposition. We have found on certain occasions that the sutures have a tendency to pull out and cut the skin in the direction in which they are placed. To avoid this one objectionable feature of the technic, we now employ small pieces of rubber tubing in the manner illustrated below. The results have been highly satisfactory.

EDITORIAL

He who has the truth at his heart need never fear the want of persuasion on his tongue.—Ruskin.

The Use of Modified Viruses in Immunology

WORKERS in the field of ultraviruses, particularly in regard to their nature and the nature of the infections they produce, are proving that in modified rather than killed viruses lies the future "science of immunization" against the group of diseases caused by these invisible entities.

Small pox vaccine (Jenner, 1789), the most widely used immunizing agent of all time, was the first example of immunization by means of what is now recognized as a *modified virus*. Its merits are not a disputable question. Through the years it has immunized millions against a onetime horrible plague.

Rabies vaccine (Pasteur, 1885) of the original type, the progenitor of rabies vaccination, may be pointed out as the second modified virus vaccine of medical history. It is a virus modified by passage through rabbits and drying in obedience to specified laboratory methods. Virus subjected to desiccation for nine days remains lethal (Hutyra and Marek); at 14 days it is nonpathogenic. Although the development of tolerance by graduated dosing is the main factor, rabies vaccine is nevertheless an example of the use of a living but modified virus.

Pigeon-pox vaccine (de Blieck) is fowl-pox virus modified by passing it through species of the Columbidae. Although this virus vaccine is claimed to be less reliable than fowl-pox virus not modified by passage through pigeons, it is the vaccination of choice for the control of fowl pox in certain European countries.

Canine distemper virus modified by numerous passages through ferrets (Green, 1940) is the latest example of a modified virus that has been shown to produce immunity to distemper in foxes. Tests of a similar modified virus in dogs, now being conducted in the field of practice, are yielding preliminary reports showing analogous results in dogs. In over 700 dogs vaccinated where the results could be studied (Swale, 1940), the immunity produced resisted experimental or natural exposure, after variable periods of time, that is comparable with that obtained in foxes on a large scale.

Yellow fever vaccine, a virus modified by repeated passages through chick embryos deprived of their brain and cord, is an additional new example of the merits of modified viruses in immunization against a grave virus infection. Reports of 57,000 vaccinations with this new vaccine in 1938 and of over a million in 1939 show that yellow fever is being conquered and that the conqueror is a modified, not a killed virus.

Poliomyelitis and hog cholera are two other virus infections in which modifying the virus for vaccination purposes is being done at present.

With the increased understanding of the nature of viruses and of virus infections that is coming to light quite rapidly, the modified virus vaccines appear to have a promising future. The work of Jenner is being scientifically assayed.

A metropolitan newspaper complains that Great Britain has banned the importation of canned fruits from the United States on the ground that it is "a severe blow to agriculture." Some day we may all learn just what a "severe blow" is like, and moreover, when nations, regardless of which, are fighting for their lives, it's not cricket for neutrals to talk of such losses.

Ethical Promotion for the Veterinarian

IN ANY FIELD which establishes and enforces professional standards of practice, the promotion of individual practice must be restricted for the common good of the professional community and the public at large. The profit motive is subordinated, by the common consent of practitioners, to the service motive. Instead of the blatant claims which too often characterize commercial promotion, the professional man is required to advance his practice by enlarging his field of service.

In veterinary medicine one of the most obvious and valuable ways that the practitioner can enlarge his field of service is to engage actively in educating the people of his community to understand man's responsibility as the master of the animal kingdom; to replace superstitions and prejudices with facts; to encourage a more scientific and realistic approach to the problems of caring for domestic and wild animals. Awareness of the important rôle of veterinary medicine in general, and of the local veterinarian in particular, will follow as a natural result of such educational activity, and the veterinarian's practice should be proportionately strengthened and enlarged.

One of the most effective means of public education is the printed word, and a number of qualified veterinarians with writing ability are now promoting both themselves and the cause of the profession by publishing articles in periodicals that reach the general public. Unfortunately, but few veterinarians can adopt this means of promotion and, therefore, the question arises as to how AVMA members, taken as a body, can secure both group and individual benefits from public education through the printed word.

As explained last month (p. 654), a proposal is now being considered that would seem to produce this result. The proposal takes the form of a monthly magazine, for the general public, which would present vividly—in words and pictures—the most interesting and significant aspects of veterinary medicine. It would be published under the supervision of the Association and distributed exclusively through members to the persons they elect. Its cost would be defrayed by the local associations and veterinarians who wish to use it as a promotional medium, and by revenue from approved advertising.

In each community there are a certain number of individuals and groups whose good will and support is valuable. It is obviously advantageous to keep in regular touch with these persons, but limitations of time may make such a program of personal contact impossible. Through the medium of the proposed monthly magazine, a regular, friendly and stimulating contact could be maintained with this entire influential group. Each member would do this by paying a small subscription price for the magazine and sending it, with his card and compliments, to the persons on his list. In fact, by the operating plan now being considered, members would need only to send their lists and cards to the AVMA office and the mechanics of distribution would be handled for them.

The magazine would act both directly and indirectly to promote the interests of the practitioner. It would act directly because it would serve as an appropriate medium of direct contact between the practitioner and influential persons. It would act indirectly because the editorial content of the magazine would stimulate the more consistent and intelligent use of veterinary services.

This admittedly selfish view of the proposal is actually an enlightened selfishness, because if the magazine widened and deepened the public appreciation of the rôle of veterinary medicine in the national community—and this is its avowed function—it would benefit all members automatically even as it produced special benefits for the individual members who participated in its circulation.

A study of the costs of such a magazine suggests that the minimum participation would be 20 subscriptions, but the cost per subscription would be sufficiently low to make this easily possible.

Books

THE JOURNAL has adopted the policy of reviewing books promptly and publishing the reviews in the first issue following their receipt. The object is to encourage authors, publishers and readers to correct an unfortunate trend started, perhaps through war, during the second decade of the century, when the writing, purchasing and reading of veterinary-medical books practically came to a halt. 'Til then the publishers of a worth while book on any subject related to veterinary medicine were assured of a sale to nearly every member of the profession. In fact, new books and new editions were seized "right off the press" and became a part of the many fine libraries veterinarians once held in great esteem. Teachers in the veterinary schools reviewed books before their classes and recommended them either as textbooks, or for "collateral reading" as the professors used to say. The situation was wholesome and contributed in a large way to the development of the service.

Following the World War came an era of no books or scarcely none. To keep up with the accumulation of medical knowledge through the wartime period and the period of readjustment, teachers were compelled to document current knowledge in the form of multigrams for the convenience of their students. Students bought and followed these and thus lost the habits of book buying and library building which were nothing less than fixed hobbies of their elders. Moreover, current literature increased in volume to such an extent that regular journals and house organs made the reading of books a lost art.

Conditions, however, are changing, and the coming of the recent works of Udall, Dukes, Williams (W. L.), Cameron, Herms, Mönnig, Huddleson, Runnells, Ross and Gordon, Mundhenk, and others are entitled to the credit. There are, however, excellent books on endocrinology, immunology, viruses and virus infections, chemotherapy, nutrition and other subjects concerning the practice of medicine that veterinarians should have and study in both their graduate and undergraduate life. To bring these to the attention of the profession is a duty periodical literature is obligated to perform.

We invite our readers to follow through with us by reading what we have to say about books in the "Book Notice" column of each issue.

Blitzkrieg and Horses

IT SEEMS that the "blitziest" of all *kriegs*, dramatized in the newspapers as all-mechanical, requires horses in considerable numbers. Two soundphotos of events going on in Holland (*Chicago Tribune* and *Chicago Herald-American*) show a long file of horses passing over a newly constructed pontoon and also a regiment of cavalry leading their horses through an unnamed town.

A French war correspondent (*Rec. de Méd. Vét.*, Jan. 1940), with several months of observation on the Western Front, says, "As long as we can't make fields accessible to autos, that is to say, solidify them for tractors, we shall need horses. Ask any artilleryman in the field what he thinks! The horse goes where others dare not venture." This is not a report on a war of the past, but on the present *Blitzkrieg*.

Lard

LARD is called the problem child of the swine industry by H. H. Kiddee in *Successful Farming*. Huge supplies are on hand and the price has dropped lower and lower, notwithstanding that lard has superior shortening properties, nutritive value and digestibility. The trouble lies in discontinued exportations. The Corn Belt hog industry was built up on exports. While European countries took two fifths of all the lard produced in the United States during the first half of the '20s, for example, exportation dropped to one fourth of the total by 1932, and now has fallen to a much lower level. "Hog producers are definitely concerned," this expert declares. The United Kingdom, once good for 250 to 350 million pounds of American lard annually, has turned to vegetable and marine oils.

WITH THE EDITORS

CONTINUING our publication of articles on diseases of cattle, W. C. McConnell of Oklahoma skillfully presents the subject from the standpoint of the practitioner. McConnell points out that some cases of milk fever are complicated by a hypomagnesemia and in these cases the usual calcium therapy should be supplemented with injections of magnesium sulfate. Apparently the licking-type mania of acetonemia is relieved by magnesium sulfate when used in conjunction with chloral hydrate and dextrose. The chronic bloater not infrequently observed in feeders should be sent to market, says McConnell.

» » »

Biester and Schwarte of Iowa State College have done investigational work in Iowa that should be followed in every state where encephalomyelitis has been observed. A close watch must be kept in order to follow the migrations of the two viruses. Thus far they have stayed put, so to speak, but if and when their tactics change, research men must be on the job to keep the practitioner apprised as to the particular type of vaccine and serum to use.

» » »

Delving deeply into the many remaining secrets of bacteria, Huddleson of the Central Brucella Station, Michigan State College, reports that the Brucella organism possesses a capsule. This discovery may lead to important information pertaining to the relative virulence of the microbe.

» » »

More about phenothiazine, and this time an encouraging report by Swanson and coworkers of the B.A.I., regarding its use in ridding cattle of gastrointestinal helminths. There is one disconcerting note: The drug in its present form is too light and bulky for practical administration in capsules. However, the drug is now available commercially in a liquid form.

» » »

Leonard W. Goss of the Ohio State University discusses canine enteritis from the standpoint of the pathologist. To those who see a clear understanding of the syndrome rather than a *sure-cure*, the article is highly recommended.

» » »

With interest in artificial insemination increasing by leaps and bounds, Robert L. Anderes' discussion on the equipment necessary to pursue this line of work should answer many questions in the minds of veterinarians.

» » »

Members who attended the Memphis session will recall the steer exhibited at the clinic whose teeth were a decided bluish color. To get the complete story read G. E. Mitchell's report in the Clinical Data section.

» » »

Veterinarians who have trouble with sutures in abdominal surgical wounds should study A. C. Merrick's short report and the accompanying photograph.

» » »

The intravenous injection of a 2 per cent solution of mercurochrome seems to be indicated in nasal catarrh, summer sores and strangles in horses. For details read A. A. Husman's report of seven cases in which the aforementioned treatment was successful.

CURRENT LITERATURE

ABSTRACTS

Extra-Uterine Gestation in a Cat

A cat 77 days after service was straining as if parturient but showed no signs of a coming delivery at the vulva (swelling, bloody discharge, etc.). The cervix was but slightly dilated and lacked the usual relaxation of an approaching birth. Palpation, however, revealed the presence of a fetus that could be pressed toward the pelvic path by manipulation. The maneuver caused violent straining with no results leading to any change of position. Although the cat was in excellent condition for removal of the fetus through the flank, the owner suggested euthanasia and autopsy as the best way to close the unfortunate event.

When the abdomen was opened, the uterus was found pressed into the right flank. It was empty and but slightly congested. In the left flank was a fetus of normal size undergoing mummification. The fetus was attached to the uterine mucous membrane with a cord that penetrated the extremity of the left horn. (*Dr. Grimpert. Gestation Extra-Uterine chez une Chatte. Recueil de Médecine Vétérinaire, cxv, December 1939, pp. 872-873.*)

The Value and Duration of Immunity to Tetanus from Toxoid Vaccination

Vaccination against tetanus has been done during the past twelve years in thousands of horses. In recent months the authors have had the opportunity of studying the antitetanic index of exactly 145 horses which were vaccinated during preceding years, in obedience to the classical plan, that is, two 10-cc. injections of toxoid a month apart and, in some instances, a third one a year later.

The usual methods of titrating serum antitoxin were employed. The results of the determination, set down in three tables, show that the retained antitoxic power bestowed by tetanus toxoid is remarkably high and stable, even in horses vaccinated eight to ten years ago. Individual variations were no greater in these than in those vaccinated but two to three years ago. Horses vaccinated with the third dose (a year after the first two) showed the highest degree of immunity. The third dose stabilizes the immunity at a high level. Where this vaccination was practiced, tetanus had disappeared.

Moreover, horses thus vaccinated are excellent subjects for the technics of hyperimmunization used in the production of tetanus antitoxin for therapeutic use. The serum possesses high antitoxic power and lends itself to preparation of a "veritable solution of tetanus antitoxin" of low protein content capable of diminishing the incidence of serum shock in man. (*G. Ramon and E. Lémetayer. Valeur et Durée de l'Immunité chez le Cheval Vaccine Contre le Tétanos au Moyen de l'Anatoxine Tétanique. Consequences. Bulletin de l'Académie Vétérinaire de France. xii, December 1939, pp. 413-421.*)

Gramacidin

Gramacidin, named for the well-known bacteriologist, is a new chemical produced by soil bacteria. It was discovered by René Dubos of the Rockefeller Institute for Medical Research, who was awarded the John Philips Memorial Award of the American College of Physicians for the discovery. Gramacidin kills pneumococci, streptococci, staphylococci, diphtheria bacilli and other germs in remarkably small doses. One grain protects mice against 10,000 fatal doses of pneumococci or streptococci.

The Effect of Weather on Rabies

Since it is a matter of current observation that cosmo-meteorologic phenomena influence microbes, viruses and diseases, Doders in West Africa studied the effect of weather, seasons and changes of seasons on the evolution of experimental rabies in rabbits. The observation concerned 7,200 animals during a period of five years.

The average period of incubation from fixed virus in the rabbits dropped sharply at the beginning of the hot, rainy season of summer and increased strikingly when cool, dry weather began. The precocious mortality curve continued throughout the cool season, then diminished again during the next warm season. (*Annales de l'Institute Pasteur, January 1939.*)

Dinitrophenol-Sulfanilamide

To the chemical cures of disease one may soon add dinitrophenol, a derivative of carbolic acid, which in combination with sulfanilamide prolongs the lives of guinea pigs experimentally inoculated with tuberculosis. Guinea pigs treated lived five to 15 months after inoculation, which is an unusual result. Howell and Link (Memphis) stated to the American Chemical Society that while the experimental work on this chemical treatment is only preliminary, the results obtained thus far are remarkable. The principle of the treatment is that dinitrophenol penetrates the bacillus and permits the sulfanilamide to enter. The idea, they added, is not new, as carbolic acid is used for that purpose in laboratory work.

Animal Transport in the Ethiopian Campaign

In the course of the Italian invasion of Ethiopia, mechanical traction proved to be manifestly insufficient. It was necessary to use animals to provision the troops. Mules, small asses and camels had to be used to bring up provisions and ordnance. According to Marshal Badoglio and General Dall-'Ira concerning animal traction, it seems inadvisable to depend exclusively upon mechanical traction.

Men and animals pass and march over any kind of terrain without care as to the line of communication. There is no known mechanical means of insuring the provisioning of troops marching over mountainous ground beyond their actual contact with communications. The logical transports for speedy movement are trucks for both soldiers and animals. But upon arrival at the point of resistance, the directions given by these officers comprise technical and veterinary instructions to sustain the campaign. In a war of movement the material necessary to install veterinary hospitals is too cumbersome, the report states.

The tent type of hospital is recommended and it should be equipped in modern fashion. Harness and saddle sores should receive special and immediate attention. Remount and recuperating depots should be provided, but collective rather than individual replacement of animals was found to be the most economical and expedient. (*Velu and Barotte. Revue Vétérinaire Militaire. Abst., Recueil de Médecine Vétérinaire, cxv, December 1939, p. 880.*)

Alcohol for Muscular Atrophy

Jaumin (*Annales de Médecine Vétérinaire,* Feb. 1939) contends that pure absolute alcohol (94 per cent) is the injection of choice for the neuropathic atrophy of the shoulder and thigh. Two injections of 10 cc. (2.5 dr.) at proximal and distal levels of the atrophied muscles give excellent results not otherwise obtainable. Recovery in 1½ to two months is reported either in subscapular nerve paralysis (sweeny) or the crural atrophy of azoturia.

War gases must be stable to atmospheric and chemical change; they must not deteriorate on storage nor attack metal. Raw material must be available and the manufacturing process relatively simple. The chances of finding a new war gas would therefore appear to be remote.—*The Veterinary Record.*

BOOK NOTICES

Science and Mystery of the Cat

From Ida M. Mellen, author of *A Practical Cat Book*, comes another *chef d'ouvre*. At a glance the reader is promptly reminded that the domestic cat belongs to the great family of Felidae, made up of everything feline from the graceful tiger of the jungles to the purring pussy of the household circle. It is refreshing to be reminded that vast areas of the earth have no aborigines of the cat family while other regions abound in them. There are no wild Felidae in Australia, New Zealand, the Arctic regions, Madagascar and other countries. North America has nine species, comprising the jaguar, mountain lion and bobcat. Perhaps, the United States is the cat's birthplace, for here its presence is accounted for during the Oligocene period (38,000,000 years ago), or many millions of years before man appeared on earth.

Australia imported domestic cats to get rid of rabbits, once well known for their depredations on that continent. The experiment was disastrous—a human error—since the feral cats resulting now prey upon fauna important to that country.

Egyptologists trace domestic cats back to the 6th Dynasty (2600 B. C.). History-minded readers will find this chapter precious. It sheds new light on the probable origin of well-known breeds. The paragraphs on tortoise-shell cats are a fine lesson in genetics.

The wild traits retained by the domestic cat are briefly sketched. The time required for the cat to become feral is longer than is ordinarily believed. C. A. White, well-known veterinarian of Los Angeles, is quoted in this chapter. The enemies of the cat are enumerated. They include dogs, foxes, coyotes, wolves, raccoons, eagles and hawks. Fifty pages on physiology and psychology of cats wander from the orthodoxy of these studies to relate practical facts. In the chapter on behavior, the author relates numerous narratives "to prove the case." Cats are jealous creatures; they may leave a fine home for alley life when a new cat is brought into the home. An old tom, however, may show a strong attachment for a new youngster of the same sex.

The tactile sense is highly developed. The tail and the long hairs (vibrissae) projecting from the muzzle are sensitive tactile organs. The sense of taste is not as keen as in dogs. Cats can not distinguish a poisoned food. In meat they detect freshness by the sense of smell. Hearing is remarkable. No animal is the equal to the cat in this regard. Though its vision is imperfect in some respects, the cat sees better in faint light than most animals. The large amount of visual purple in the retina accounts for that faculty. Consequently, vitamin A is a factor of unique importance in the feline dietary.

The chapter on voice is delightful. The voice runs up two octaves from middle *c*. A tom can run a whole octave in one yell and can drop to lower *g* for a good long growl. There are notes for distress, delight, hunger, coitus, etc., and shifts of keys for backfence duets, all of which the author puts at a definite place on the scale.

Cat-to-cat, cat-to-dog and cat-to-x friendships will astonish the casual connoisseur of feline life. Friendships between cats and mice and pet birds are indeed news. But, who does not recall Barnum's "Happy Family," comprising dogs, cats, birds, mice, rabbits, guinea pigs, crows, pigeons and monkeys—all living together in serene contentment.

The chapter on cat haters and cat lovers is a frank statement of facts for which the author deserves to be complimented. The old word *ailurophobe* (fear of cats) of the French authors is revived, and compared with the other well-known "phobias" of zoötechnics and other branches of veterinary science.

The book, throughout, is a classic—entertaining, amusing, instructive, fascinating—and it is full of everyday, practical information that rounds out the medical education

of the best feline specialists. (*The Science and the Mystery of the Cat. By Ida M. Mellen. Charles Scribner's Son, New York, 1940. 275 pages, illustrated. Price, $2.75.*)

Doggerels

Voilà, T. P. White, longtime Bureau veterinarian of the top bracket, writes a book of poems on the dog, a sort of farewell address, for White is about to retire from active duty in compliance with arithmetic of governmental geriatrics. Just why a man as keen as a sophomore, as quick as a halfback and as strong as the shot putter of the Olympic games should be retired is baffling enough to drive anyone to the writing of odes. But the joke's on us. The crux is that White has been "holding out." Though known without challenge as a connoisseur of farm-animal medicine, sanitary science and police, and food inspection of the higher order, none has ever suspected that the author's knowledge of dogs is sufficient to set down 87 delightful pages of reading material in strictly Miltonian style.

White's modesty, characteristic of his ancestry, prompts him to start out by defining "doggerel" as a "worthless verse," when, as a matter of fact, each poem, without exception, spells worthiness in the highest degree. No one without a profound knowledge of veterinary science and a keen sense of observation could have "psychoanalyzed" the various breeds of dogs in health and disease as clearly as the author of these 122 poems. Among them are poems on rabies, blacktongue, demodectic mange, distemper, fleas, canned dog food, dog catchers, fashions in dogs, show dogs, grandpappy's dog, the dog watch, war dogs, and other catchy titles too numerous to mention. Of breeds there are odes on the mongrel, the Pointer, the Collie, the Dachshund, the Eskimo, ratter, terriers and others, through a long list of titles portraying a lot of wisdom and horse sense about the canine species in its various estates. The book is amusing, entertaining, witty and factual. As Warren declared at the first surgical operation performed under general anesthesia, "This is no humbug."

Doggerels is something new in veterinary literature and is neither too long to tire nor too short to cover a great deal of useful ground. With slippers, *fauteuil*, hassock and briar before the cracking fire of winter or on the hammock in the cool of a summer evening, White's poems on the dog will round out "the end of a perfect day." (*Doggerels. By T. P. White, D.V.M. Thrift Printing and Publishing Company, Rockford, Ill. 1940. 87 pages, cloth bound. Price, $1.00.*)

The Principles of Parasite Control

A booklet of limited scope on the subject indicated by the title is a reprint of three well-prepared lectures given at the Royal Veterinary College under the sponsorship of the University of London. The author, who is not a stranger to readers of veterinary literature and parasitologists, occupies the chair of parasitology at MacDonald College, McGill University, Quebec. As the author states in the preface, the brochure is a supplement to the book, "Control of Animal Parasites," by the late Maurice C. Hall, recalled for having its text written in unique military language to emphasize the general principle governing the control of the parasites affecting domestic animals.

The reader is reminded that while parasites do not, as a rule, do any great harm to their hosts, there are states of hyperparasitisms capable of almost entirely exterminating a host species. The crowding of the artificial life of domestic animals distinguishes the degree of their parasitisms from those of their roaming contemporaries in wild life, such as the North American bison. Conversely, wild animals living in dens are highly parasitized. Foxes, cats, dogs, horses, sheep, swine, cattle and poultry are victims of severe parasitisms. The cause, of course, is the millions of eggs passed and the opportunity of ingesting them. "Premunition" is mentioned as a form of temporary resistance. Scientific treatment lies in knowledge of life histories

and the bionomics of the parasite concerned; hence, identification comes first in control measures.

The physical and chemical treatment of ova-infested manure is discussed at length and a long list of chemicals useful for the purpose is given. Though of great importance the world over, little work has been done in the control of parasites in pastures and arable land. The cost is an obstacle, although the use of copper sulfate to destroy snails has been employed extensively. Bleaching and lime are ineffective. Mixed grazing (horses, cattle, sheep) may give "startling results," the author declares. On horse pastures sheep, for example, may consume 100,000 eggs per head daily and thus protect the exposure of horses to that extent.

A fine, instructive reminder of known facts, is our evaluation of this latest literary fling of our distinguished Canadian colleague. (*The Principles of Parasite Control. By Thomas W. M. Cameron, professor of parasitology, MacDonald College, McGill University. National Business Publications, Gardenvale, Que. 48 pages. Cloth bound. Price, 50 cents.*)

Embalming Fluids

One hundred and sixty-five pages of a well-written and manifestly informative text on embalming fluids may seem *nihil ad rem* in veterinary literature. On the contrary, the treatise is full of extremely useful information to any one dealing with disinfection, antisepsis, deodorization and preservation of organic matter.

The historical development of the embalming art from the second Egyptian dynasty (3400 B. C.) and beyond is a chapter that clarifies one's vague knowledge of that subject. Particularly enlightening is a classical chapter on the chemistry of putrefaction, that bacterial or enzymic degradation of dead animal or plant tissue concerning all who practice any branch of medicine.

The text on "Embalming Fluids in General" is a revealing lesson on antiseptic formulas, including 20 which are protected by patent. A study of them shows a great deal of "antiseptic ingenuity" in making up combinations of that type of compounds. The chemical and physical properties of these compounds and the analytic chemistry of formalin and embalming fluids in general are described in detail in separate chapters. The book ends with a survey of the laws governing the art of embalming in the different states. The phenol coefficient of a long list of chemicals in common use is a valuable reference—a handy *aide memoire*. (*Embalming Fluids. By Simon Mendelsohn, F.A.I.C. Chemical Publishing Company, New York, 1940. 165 pages. Price, $4.00.*)

The North American Insect Pests

There is perhaps no greater danger to public welfare than complaints (wise cracks) of political newspapers and campaign speakers that the government is spending money uselessly in the study of insect life. The columnist who thought it was quite humorous that the federal bureau of entomology and plant quarantine was studying the life of the termites is certainly a candidate for Public Enemy No. 1.

According to Radcliff (*Reader's Digest*, Jan. 1940), ours is the most pest-ridden country in the world and the price the people are paying in loss of property (plants, animals, buildings, etc.) runs into astronomical figures annually. Beetles, ear worms, leaf eaters, grasshoppers and weevils alone do over $2,000,000,000 damage every year, and only veterinarians, parasitologists and farmers seem to comprehend the damage suffered from endo- and ectoparasites of swine, sheep, horses, poultry, cattle and pet animals.

Scientists and practitioners engaged in the control of metazoan parasites of plant and animal life need better press agents, or perhaps the country needs more of the altruistic type of statesmen. Loose talk to receptive audiences on this, the world's greatest menace, strikes at the very root of successful government.

When the top soil goes, man goes.—*Theodore Roosevelt.*

THE NEWS

AVMA Activities

An Additional Statement from the Board of Governors Regarding a Dog-Food Advertisement

The following letters are self-explanatory and denote the progress which has been made in adjusting the unfortunate use of the name of the AVMA in connection with an advertisement.

Swift & Company (Inc.)
Central Office
32-34 Tenth Avenue
New York, N. Y.

May 15, 1940

Dr. Cassius Way, President
American Veterinary Medical Association
25 Vanderbilt Avenue
New York, N. Y.

Dear Dr. Way:

We regret to learn that the officers of the American Veterinary Medical Association and many of its members strenuously object to the use of the name of the Association in publicizing and advertising the book entitled "How to Own a Dog and Like It," which was offered to the public in conjunction with the advertising of our dog food "Pard."

We respect your position that the AVMA must not be commercialized, directly or indirectly, by anyone, either within or without the Association.

Now that you have called the matter to our attention, we are happy to advise you that we will discontinue using the name of the American Veterinary Medical Association in any of our advertising and, in so far as is within our power, in advertising the book itself. From the books which we distribute in the future we shall remove the dust jacket, bearing the name of the Association.

We regret this misunderstanding and we do hope that the members of your association will continue to realize our desire to be of real help in emphasizing the importance of the veterinarian in the life of the community.

Sincerely yours,
[Signed] GEORGE J. STEWART,
Vice-President

CMO

CMO/s.

The following letter has been received from L. A. Merillat, executive secretary:

To the Board of Governors:

The writing of a foreword for a book to be used as a premium in the sale of a prepared dog food and permitting my title of executive secretary to be used in advertising it was done with no intent to exploit the Association in a manner objectionable to the membership. Since the Board and influential members of the Association have protested this act, their wishes will be respected in the future.

Respectfully,
[Signed] L. A. MERILLAT.

The publishers of the book are to be heard from on a basis of final adjustment of deleting the AVMA name from the foreword and removing the dust jacket bearing the name of the Association. A full report of this matter will be made to the Executive Board at Washington.

[Signed] H. W. JAKEMAN,
CASSIUS WAY,
A. E. WIGHT,
Board of Governors.

An Answer

We wish to call to the attention of the membership an editorial pertaining to the dog-food-testing program which appeared in the June issue of a veterinary periodical. It is stated therein that the AVMA testing program should be reinvestigated.

We wish to point out that the entire dog-food-testing program has been receiving careful study since the Memphis session and that improvements have been made to date and others are pending.

Moreover, contrary to the statement that hasty action was taken, it must be borne in mind that the testing program was presented to the House of Representatives in the form of a definite resolution only after two years of intensive study by the Executive Board.

That the program has not resulted thus far in the applications of more manufacturers for the seal should not be construed as meaning that it is a failure. A committee of the Board has been in contact with representatives of large manufacturers obtaining their viewpoints, and it has received hearty coöperation in formulating rules and regulations which should be acceptable to all concerned.

With regard to the statement that there are no veterinarians on the scientific council, it is well to point out that the entire testing program is under the supervision of veterinarians. Furthermore, practical feeding tests are conducted in small animal hospitals by veterinarians.

Since the editorial in question shows an entire lack of knowledge of the facts, it should not influence the opinion of the members until a detailed report of developments is published.

[Signed] H. W. JAKEMAN,
CASSIUS WAY,
A. E. WIGHT,
Board of Governors.

The Dog-Food Committee Reports Progress

The dog-food committee reported at the seventh annual American Animal Hospital Association convention, held in Hollywood, Calif., March 27-30, that much progress had been made during the past year.

The committee was happy to report the agreement of the American Veterinary Medical Association to coöperate with the American Animal Hospital Association in its dog-food-testing program. This agreement was passed by the Executive Board and House of Representatives at the Memphis meeting last summer.

It further reported that one change had been made in the advisory council. R. Adams Dutcher of the department of agriculture and biological chemistry at Pennsylvania State College, State College, Pa., was appointed to succeed B. W. Fairbanks of the University of Illinois.

On December 12, 1939, seal No. 5 was issued to Friskies, a dry dog food manufactured by Albers Brothers Milling Company of Seattle, Wash. Albers Brothers is a subsidiary of the Carnation Milk Co. of Milwaukee, Wis. The addition of Friskies to the list of approved foods makes available foods bearing the seal in all parts of the United States.

Annual retesting of foods bearing the seal has been in progress throughout the entire year. All of these foods were completely retested chemically and biologically during 1939. The protocols of these tests have been forwarded to the advisory scientific council and recommendations have been received that the foods now bearing the seal remain on the list of approved foods.

The food-testing program sponsored by the AAHA and the AVMA has been explained at a number of veterinary meetings during the past year. President Way discussed the program in California, Iowa, Texas, District of Columbia and Illinois. It was likewise discussed by other veterinarians in Virginia, Kentucky, Kansas, Colorado, Missouri, Louisiana, Massachusetts, Connecticut, Rhode Island, Pennsylvania, and Toronto, Ont. It has been the opinion of the committee that many veterinarians are not well enough acquainted with the testing program to sufficiently understand it. Therefore, it was concluded that educational programs should be instituted at various state associations. This has proved to be a valuable asset.

For several years the committee on foods of the AAHA and the advisory scientific council have had under consideration a plan which would permit the acceptance for review, tests conducted at independent laboratories not associated with manufacturers. This tentative suggestion was presented by the council and committee at a conference that was held in New York City on March 9, 1940. Following careful deliberation it was suggested that the committee draft a formal proposal and forward a copy to each member of the council for opinion. The proposal as submitted read as follows:

"Committee on foods of the American Animal Hospital Association and American Veterinary Medical Association will accept for consideration the results obtained by independent laboratories, not associated with the manufacturer, on market samples of dog foods.

"The committee on foods will refer such data to the advisory council and the council will examine the data from the standpoint of completeness and validity. If the council is of the opinion that the data are of satisfactory character, it may then report to the committee on foods approval or disapproval of the product on the basis of these data in place of data obtained under the direction of the committee on foods, as is the present practice.

"If the advisory council is not satisfied with the data submitted, it may ask for further data from the director of the laboratory in which the work was done, or it may require confirmatory tests by any other laboratory of its selection.

"The foregoing proposal would not eliminate the chemical and biological test now being made under the direction of the committee on foods, but it could take the place of it as outlined above in the case of certain products.

"The chemical and biological analysis under the direction of the committee on foods would be available to those manufacturers who have not had tests conducted on market samples by independent laboratories.

"If the food is accepted on either of the above bases, it will be subject to an annual retest by the committee. The present practice consists of a chemical test and biological analysis by the Illinois method. However, for those foods which make special claims—for example, vitamin claims—the committee may require a laboratory test to substantiate the claims.

"In a similar manner the results of practical feeding tests will be received for consideration by the committee."

The advisory council officially adopted this proposal. It was referred to the committee on foods of the AAHA and received unanimous approval. It likewise was unanimously accepted by the AAHA in convention at Hollywood.

Under this plan it will be possible for a manufacturer to assemble and submit to the

committee and council the results of tests by independent laboratories on market samples. The manufacturer, however, will be required to execute the same agreement as is now in force. Should data submitted be considered adequate by the council and the committee, a seal will be issued under the terms of the contract. In such an instance a manufacturer will be allowed a refund of the original price of the test otherwise conducted.

Agnes Fay Morgan, Ph.D., of the department of animal nutrition, University of California, Berkeley, discussed "Deficiencies and Fallacies in Canine Diet." The following is an abstract of Dr. Morgan's paper and discussion:

"The control of the nutritive value of dog foods is now more than ever a matter of importance because dog owners are being educated to rely on a canned or dried mixture as the sole food for the dog and because, ironically enough, scraps from the modern kitchen are likely to have little value as diet supplements. The exact nutritional needs of dogs are not yet known completely but some of them are established and these are here reviewed.

"*Protein Need.*—The protein requirement of growing pups and reproducing females is greater than that of adult dogs. Probably 25 to 50 per cent of the dry matter of any dog food should be protein and the quality of this protein should be good. Milk, egg and meat proteins are superior to those from vegetable sources, although dogs can use cereal proteins if they are supplied in sufficient amount. Autoclave or processing temperatures damage the biological value of proteins to some extent and this must be kept in mind in the use of canned foods.

"*Blood Making.*—Iron and possibly other metallic elements are needed by dogs for blood formation, and the availability of the iron in their food should be known. Meat, blood, alfalfa and spinach appear to contain a larger proportion of an unabsorbable iron than do fruits, liver, whole cereals and egg yolks.

"*Vitamin D, Calcium and Phosphorus.*—The vitamin D requirement of dogs has been the subject of much confusion in recent years. We have found that several factors affect this requirement, namely, the reaction of the diet, amount of light and exercise, dietary calcium and phosphorus and their ratio to each other, and most important, the breed and rate of growth of the dog. Certain large breeds, such as German Shepherds, Setters and Airedales, are peculiarly subject to rickets and, therefore, have a larger requirement for both calcium and vitamin D than do smaller dogs. With 250 U.S.P. units of vitamin D per kg. (2.2 lb.) of body weight per day, these large dogs have developed severe rickets in our laboratory while Cocker Spaniels have grown normally on 72 units per kg. per day. The latter figure is probably the minimum for safety for any dog during the growing period. Whether adult dogs living at least part of the time out of doors need any vitamin D we do not know, anymore than we know the answer to the same question about adult humans.

"When the food is deficient in either calcium or phosphorus, rickets can not be prevented, no matter how much vitamin D is given. The low availability of cereal phosphorus must be thought of in this connection.

"Dogs are sensitive to overdosage with vitamin D. We have seen severe damage by calcification of kidneys, heart, aortas and lungs in young dogs given 10,000 U.S.P. units of vitamin D per kg. per day for several weeks. This establishes a ratio of 40 to 1 between the toxic and therapeutic levels of vitamin D.

"*Vitamin A Requirement.*—The vitamin A need of dogs has not been well established but there is evidence that a high consumption of this vitamin provides certain safeguards. Thus, with 800 U.S.P. units of vitamin A per kg. per day, young Cocker Spaniels grew normally but did not reproduce successfully nor remain free from infection as did their litter mates fed similarly but given 10,000 U.S.P. units of vitamin A per kg. per day, a large excess. Likewise, dogs given the toxic excess of vitamin D were protected against the effects by this amount of excess vitamin A.

"*The B Vitamins.*—The vitamin B_1 need of dogs as well as that for several other members of the vitamin B complex has been fairly well established. Failure of appetite, paralysis and other signs of polyneuritis are easily developed in dogs given too little vitamin B_1. Since this substance, thiamin, is now available in synthetic form and at low cost, there is a tendency for manufacturers to add small amounts of it to dog foods and to human foods, too, and to make resounding claims thereon. But thiamin, necessary as it is, is only one of at least five B vitamins, all needed by dogs. Vitamin B_6, riboflavin and nicotinic acid, all available in pure form, have each been demonstrated as necessary for dogs. Vitamin B_6 deficiency produces severe and fatal microcytic anemia; riboflavin deficiency, paralysis and nervousness; nicotinic acid deficiency, gastrointestinal symptoms and inflamed gums. We have seen these conditions develop in dogs within three to five months when all other nutritive needs had been met except that for the one vitamin under observation.

"The filtrate factor or factors of the B complex also must be supplied to dogs as well as to other species. When this factor is missing, the fur of the dogs gradually turns gray, growth is subnormal, sex development is delayed and gastrointestinal symptoms, such as

vomiting, bloody diarrhea and lack of appetite, develop.

"When nicotinic acid as well as the filtrate factor is missing from the diet, the symptoms of both deficiencies are less severe and less prompt in appearance. With nicotinic acid deficiency, only typical suppurative blacktongue is not seen. It is probable that endemic blacktongue is a multiple deficiency disease with superimposed infections, just as human pellagra may be, rather than the result of nicotinic acid deficiency alone.

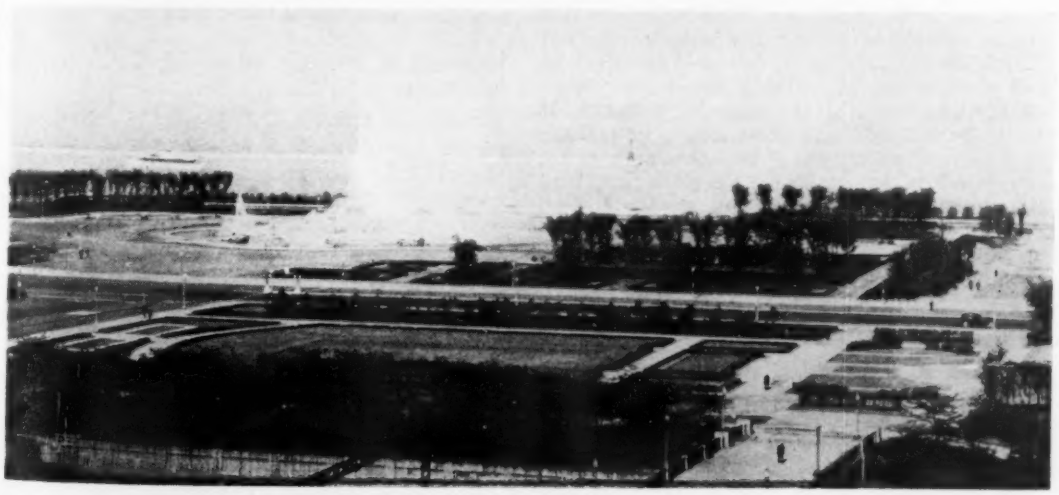
"It is clear that the study of dog nutrition is not yet finished and that, therefore, commercial dog foods must continue to be scrutinized carefully. The work of the committee on foods of the American Animal Hospital Association in coöperation with the American Veterinary Medical Association in evaluating both chemically and biologically the foods submitted to them is of great importance. The award of the seal of approval by this committee is an indication that the food is a worthy and complete product and that the claims made for it by its manufacturer are justified. Yearly reëxamination of market samples also is necessary and must be conscientiously carried out.

"If the dog-food industry in this country bulks only $100,000,000 yearly, a conservative estimate, for the feeding of at least 28 million dogs, it is clear that many dogs are not being well fed or, at least, not with food designed for their use. More and better dog foods will be used in the future, no doubt, and honest manufacturers will strive to supply them, but this will be accomplished 'not through advertising' or sentiment but as a result of scientific research 'and impartial assays.'"

Your New Home

Moving from 221 N. LaSalle St. to 600 S. Michigan Ave. is one of many steps taken to improve business management and surrounding atmosphere of the Association's executive office. A part of the motive is a saving of over $1,000 a year in rent. But besides this advan-

The new office of the Association is located on the eighth floor of this building.



Chicago's lake front as viewed from the new home of the AVMA.

tage a saving of perhaps twice that amount will be made from the modern installment which was necessitated by the increase of the Association's activities.

The building is located on Chicago's famous lake front, overlooking Grant Park and Lake Michigan. It is flanked to the north by the Congress and Auditorium hotels, the Chicago and Illinois athletic clubs and the Chicago Public Library; to the south by the Blackstone and Stevens hotels. The outlook, named from north to south, shows the Art Institute, the Buckingham Fountain, the Chicago Symphony Orchestra shell, the Field Museum of Natural History, Shedd Aquarium and Adler Planetarium.

The office borders conveniently on all types of transportation, post offices, printing plants, hotels, stores and points of general interest.

Our neighbors within the building include a number of scientific societies and publishers of industrial and scientific magazines. The building houses the Illinois Department of Registration and Education, the Farm Foundation, National Parents and Teachers Association and magazine, Scientific Research Associates, Committee on Rural Education, the Magazine Mart, the Army and Navy Club and many other fine enterprises.

The street address is 600 S. Michigan Ave., the room is No. 801, and the telephone number Wabash 2140. The floor space, though approximately the same as that previously occupied, has been specially designed for our needs.

Members are cordially invited to visit this new center of veterinary activity and to acquaint themselves more thoroughly with what is going on, to look closely into the wisdom of making this change of address and of office arrangement.

Alumni Dinners

Alumni dinners at the Washington session are to be held at 6:00 p. m., Tuesday, August 27, and the committee in charge of this feature will provide separate dining rooms for almost all of the alumni of the different colleges. It would be helpful to the committee, in making final arrangements, to learn the number of veterinarians and ladies who plan to attend the dinners. Communications should be addressed to A. E. Wight, chairman, c/o Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

Rabies Committee Meets

Colonel R. A. Kelser, chairman of the special Committee on Rabies, called a pre-convention meeting of that committee on May 27 at the Army Medical Center, better known as the Walter Reed Hospital. Other members of the Committee are Barnes, Cotton (C. E.), Gillmann, Hagan, Lacroix and Schoening.

Seagraves New Executive Board Member

Chas. H. Seagraves of Oregon City, Ore., is the new member of the Executive Board for District 7, having been chosen in the recent election to fill out the unexpired term of W. A. Sullivan, whose removal outside of the district necessitated his resignation.

Chas. H. Seagraves

Dr. Seagraves enlisted in the veterinary corps in 1917 and, following his graduation from the San Francisco Veterinary College in 1918, reported for duty at Camp Greenleaf, Ga. After being discharged from the army, he was engaged for one year in meat-inspection work at Spokane, Wash., at the end of which he resigned to study parasitology at the University of California. One year later he accepted a position as assistant state veterinarian in Idaho. Dr. Seagraves continued in that office until 1924, when he resigned to enter private practice.

Since that time he has held numerous positions in veterinary organizations of Oregon and has been a member of the state examining board for 14 years, in addition to participating actively in the general practice firm of Drs. Seagraves and Phelps.

"More important than all else," Dr. Seagraves advises, "is that Mrs. Seagraves and I are the parents of five fine boys and a daughter."

Ingmand to Attend Oklahoma, California Meetings

Assistant Executive Secretary Ingmand will attend the Oklahoma state meeting at Stillwater, June 17-18, and the California state meeting at San Jose, June 24-26. During the course of his trip he will inspect Denver and San Francisco with a view to determining their suitability for the 1942 AVMA convention, which will be held in Zone 4.

Jakeman and Brumley Confer with Packers

H. W. Jakeman, chairman of the Executive Board, and O. V. Brumley, Executive Board member and chairman of the special dog-food committee, spent May 16 and 17 in Chicago conferring with officials of the Institute of Ameri-

Premise of the Washington Session

Due to the labors of the Committee on Local Arrangements directed by John R. Mohler, and of the section officers, the program of the Washington session, August 26-30, is nearly complete. Save for the clinic and minor parts of the entertainment, all details will be published in the July issue—the Convention Number.

The Literary Program

The reporters for the literary part of the program are prominent figures in their fields, thoughtfully chosen, as is also the ground to be covered by them.

Papers or abstracts of them will be printed in pamphlet form for distribution at the time of registration. In order that papers may be printed in time to submit proofs for corrections, the authors are being requested to send in their manuscripts before July 15.

The objects of pre-convention publication of papers and/or abstracts are numerous, namely: 1) Sitting through the reading of long papers difficult for an audience to follow to the best advantage is avoided. 2) The study of papers before they are presented leads to fruitful, open discussion. 3) The ground covered by the convention is more complete. The developments of the year on outstanding subjects can be placed on record. 4) The purpose of a literary program of a scientific society is to enlighten all of the members and the world at large, not merely those who happen to attend the meetings. Lengthy papers covering the subject completely are, therefore, desirable and not objectionably time-consuming. 5) Requesting reporters to present a subject in a stated number of lines to be read in a definite length of time is not apropos in the work of a professional society. 5) Advance notice of the subject matter to be presented at a meeting is appreciated by related science publications.

The pre-convention publication of papers and abstracts was started for the 1939 meeting (Memphis) at the suggestion of the Section on Research. Better to test the popularity of the plan, the Section on General Practice was included. Since everyone was pleased with the innovation, it was decided to follow the plan throughout the literary program for the Washington session. The executive office is attempting to make this new feature of the annual meetings a prominent and, hopefully, a permanent reform. The step should increase the Association's usefulness in all future years.

Entertainment

"Visit the National Capital in August" is more than a lure to build up attendance. All North American citizens should become more conscious of this center of a great nation—the hub city of 130,000,000 people, which, since the turn of the century, has developed into a place of splendor and dignity symbolic of every national activity and resource. Washington of 1940 is the cynosure of all eyes the world over. What it represents to this civilization today concerns all mankind. Since the veterinary profession is delegated to aid in the conservation of the world's greatest hope—tilling the land—nowhere could a better grasp of the magnitude of its labors be obtained than in the palatial group of buildings housing the United States Department of Agriculture. But these, significant as they are in the veterinary sphere, are but a fringe of the stately surroundings awaiting those who journey to Washington to participate in the 1940 meeting. When sight-seeing includes the awe-inspiring events which led to the founding and development of this country, it is more than the pleasure of attractive scenery. "Visit the National Capital in August" is, therefore, more than a plea to swell attendance. It may or should mark the departure of a new era in the growth of the veterinary service and in a new appraisal of its influence on national welfare.

The trip down the Potomac to historic Mount Vernon is but one of the many features to be announced in detail in the July issue. Plan now to make a trip to Washington your 1940 vacation. Nothing comparable in entertainment is of record in the annals of the Association.

Cost

Plans for parking cars at reasonable rates, hotel accommodations to suit every purse, side trips at low rates, and menus of every price insure for the Washington meeting a record

(*Continued from preceding page*)

can Meat Packers in regard to the AAHA-AVMA dog-food-testing program.

Decennial Pharmacopoeial Convention

The newest of the Association's projects is participation in the Decennial U. S. Pharmacopoeial Convention, which was held in Washington, D. C., May 13-15. The Association was represented by R. L. Mundhenk of Alabama Polytechnic Institute and H. E. Moskey of the federal food and drug administration. The initial achievement of these representatives was the admission of the AVMA to full membership in the pharmacopoeial convention along with five other national organizations. A full report of the convention by Dr. Mundhenk will be published in an early issue.

in reasonable costs. The banquet and alumni dinners will cost the same as usual for these events.

HOTELS

It is suggested that those planning to attend the convention make their reservations for hotel rooms at the earliest possible date. At the Mayflower Hotel, which will be convention headquarters, the rates are as follows: Single room for one person, $3.50-$5; double room with double bed for two persons, $5-$7; double room with twin beds for two persons, $6-$9. Surrounding hotels and their rates are:

Hotel	*Single*	*Double Bed*	*Twin Beds*
Lee House	$3.00	$5.00	$6.00
Blackstone	...	5.00	6.00
New Colonial	2.50-3.00	4.00	4.50
Lafayette	2.50-3.00	3.50-4.00	4.00-4.50
Martinique	3.50	...	5.00
Benedick	2.50	3.50	4.00
Willard	3.50	5.00	6.00
Washington	3.50	5.00	6.00
Raleigh	3.50	5.00	6.00
Harrington	3.00	4.00	5.00
Hay-Adams	3.50-5.00	5.00-6.00	6.00-8.00
Roosevelt	3.00-3.50	4.00-5.00	5.00-6.00
Hamilton	4.00	5.00-6.00	6.00-7.00

WEATHER

The hottest weather during meetings of recent years was encountered in Minneapolis, Kansas City and Omaha, and the coolest at Lexington, Atlanta and Memphis. Latitude is, therefore, not the criterion, and in this day of air-conditioned rooms it is an insignificant matter. A survey of the temperature in Washington during the last week of August compared with that of other cities suitable for holding conventions fails to show figures that are unfavorable to the national capital in this respect.

EDUCATIONAL AND TECHNICAL EXHIBITS

There will be unusual educational exhibits in a spacious room provided for that purpose. Their scope and character will be described in the Convention Number. Governmental departments will participate in a large way in these displays.

The technical exhibits promise to be outstanding this year. They will flank each side of the wide corridor leading to the meeting rooms, and they represent practically all of the producers of the supplies used by the veterinary profession. The meeting will offer an unusual opportunity to study these exhibits and to meet, perhaps for the first time, prominent figures of the "service of supply." Correspondence with the exhibitor group indicates that numerous sensational specialties and apparatus will be shown and demonstrated. The fine coöperation of exhibitors with the executive office and the Committee on Local Arrangements is especially worthy of mention.

CLINICS

There will be large and small animal clinics at the hotel. A special room will be provided for the poultry clinic, and a demonstration in large animal surgery at Fort Meyer, sponsored by veterinary officers of the army, has been scheduled. The federal bureau of animal industry has planned a trip for research men to the Animal Disease Station at Beltsville, Md.

APPLICATIONS

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Marold, Gordon John, 221 N. Delaware, Manhattan, Kan.
Martin, John Gentry, Gladbach Apts., W. Magnolia Ave., Auburn, Ala.
Merriman, Arthur Kohler, Sullivan, Ill.
Mesenbrink, Roy Leonard, 711 Osage, Manhattan, Kan.
Misener, Andrew Grant, 6448 N. Clark St., Chicago, Ill.
Mitchell, Albert P., Osborne, Kan.
Mitchell, John Thomas, State Serum Plant, Auburn, Ala.
Moore, Charles Carson, Louisburg, Kan.
Moore, Paul M., 1202 S. Washington St., Beeville, Texas.
Murphy, Claude F., 1716 Fairview, Manhattan, Kan.
Nelson, Arthur Ealton, Essex, Iowa.
Nelson, James M., Sigourney, Iowa.
Newcomer, J. Nelson, 216 E. Main St., Mount Joy, Pa.
Noller, Paul Richard, Mankato, Kan.
Nowlen, James Clare, 123 Center Cross St., Sycamore, Ill.
Perley, N. J., Oakland, Iowa.
Phillips, Paul Edward, 1718 Fairview, Manhattan, Kan.
Philpy, Buford Doyle, 108 N. 17th St., Manhattan, Kan.

Price, Si Roy, 427 S. Banker, Effingham, Ill.
Rosenbaum, Nathan Matthew, 25 Ashton Road, Yonkers, N. Y.
Rosner, Stephen F., 8425 Gravois Ave., St. Louis, Mo.
Rosner, William, 721 Fremont St., Manhattan, Kan.
Schafer, Leroy Edward, 1214 Bluemont, Manhattan, Kan.
Schlaegel, Francis Noel, Olsburg, Kan.
Schweiger, Vincent J., 1909 Anderson, Manhattan, Kan.
Shartle, Clarence F., Stilesville, Ind.
Shoeman, John D., Dallas Center, Iowa.
Simonsen, Earl Dean, 101 E. Elm St., Cherokee, Iowa.
Simonsen, Doyle Warren, Quimby, Iowa.
Skala, Joseph Rudolph, 4732 W. North Ave., Chicago, Ill.
Slappey, Willard Orr, P. O. Box 95, Plains, Ga.
Smith, G. T., P. O. Box 276, Reinbeck, Iowa.
Smith, William Chester, Box 486, Auburn, Ala.
Smith, William Edgerly, 421 N. 16th St., Manhattan, Kan.
Snider, Charles Henry, 616 Veronica, East St. Louis, Ill.
Spencer, Guy Roger, 930 Bertrand St., Manhattan, Kan.
Steele, Carroll Chester, Treynor, Iowa.
Steele, John Richard, 904 2nd Ave. S., Lethbridge, Alberta.
Swartz, Russell Phillip, 1000 Napa Road, Vallejo, Calif.
Swindle, B. Conwell, 209 W. Glenn Ave., Auburn, Ala.
Tabusso, Marino Edmondo, Casilla 1234, Lima, Peru, S. A.
Tempero, Morgan W., Veterinary Hospital, Manhattan, Kan.
Thomas, Kenneth J., 235 Wonder St., Johnstown, Pa.
Traskus, Anthony Dominic, 240 N. Main St., Pittson, Pa.
Tucker, Joseph, 382 Edgewood Ave., N. E., Atlanta, Ga.
Tuttle, George D., Garwin, Iowa.
Van Ness, Glenn Benton, Manhattan, Kan.
Vollberg, Hugo Frederick, 4304 Yuma St., N. W., Washington, D. C.
Way, Edwin Ellsworth, 1905 Moore St., Huntingdon, Pa.
Whitehair, Charles Kenneth, R. R. 1, Abilene, Kan.
Williamson, John William, P. O. Box 71, Houston, Texas.
Wire, Donald A., 418 S. Howes St., Fort Collins, Colo.
Wise, Thomas Murray, Sumter, Ga.
Witt, Leonard Charles, Box 368, Scribner, Neb.
Witten, Joe M., 2051 College St., Jacksonville, Fla.
Woodard, Isaac E., Box 374, Natchitoches, La.
Yokum, Dale J., 312 W. Madison, Iola, Kan.
Young, Tyler J., 769 Vance Ave., Memphis, Tenn.

STUDENT CHAPTER ACTIVITIES

Colorado State College

Guided by the unequaled honor system, students of Colorado State College have built a well-organized chapter of 160 members. In the programs conducted each Monday evening, lectures are given by prominent veterinarians of the state. At times men engaged in other fields are secured to speak on subjects of interest to the students.

The chapter won second place for its technical float in the recent College Day parade. The annual dinner dance, held on April 27, was well supported by the members and faculty.

On May 13, at the last meeting of the semester, Dean I. E. Newsom presented the diplomas issued by the executive office of the AVMA to the seniors who have completed the requirements for graduation from the junior chapter, and he spoke briefly on the future of graduating veterinarians. Seniors receiving diplomas were James Adams, Owen Andrus, David Bartlett, Jack Bushnell, George Glover, Oliver Grace, Harry Gaskill, Harry Hardenbrook, Richard Hawes, Leland Head, Alvin Hoerlein, Jacob Holtzman, Jack Ketcham, Lawrence Metzger, Donovan Meskimen, Donald Wire, Robert Zimdahl, and August Zancanella.

The following men were selected to direct the chapter for the ensuing year: Vincil Bishop, president-elect; Clayton Mikkelson, vice-president; Ray Watts, secretary; and Delwin Jackson, treasurer. John Williams was elected faculty sponsor.

HARRY SORENSEN, *Secretary.*

Cornell University

On Tuesday evening, March 21, the Cornell chapter held its first annual honor day dinner and dance. Formerly, honor day exercises were held in the amphitheater of the college with but a brief intermission in the regular schedule to provide time for awarding prizes to outstanding students of veterinary medicine. On this occasion, however, 250 guests were present at the dinner given in the Memorial Room of Willard Straight Hall, Cornell's student social center. All necessary preparations were handled entirely by student committees in sponsoring what this chapter considers its most important achievement since its organization in May 1939.

Following the dinner, President Edgar W. Tucker extended a welcome to the guests and his thanks to the committee which had cooperated in making the event a success.

The introduction of speakers was done by William A. Hagan, dean of the veterinary college. Dean Hagan always has been of the opinion that honor day exercises should be a student activity. In his preliminary remarks before

Cornell Chapter Holds First Honor Day Dinner-Dance

Seated at the speakers' table (left to right) are Morton Meisels, Mrs. W. A. Hagan, Cassius Way, Mrs. H. Wallace Peters, E. W. Tucker, Mrs. Way, Mr. Peters, Miss Foyle and Dean Hagan.

They're 100 Per Cent AVMA

The graduating seniors of the College of Veterinary Medicine, State College of Washington, have all applied for membership in the Association. From top to bottom, left to right, they are R. Tweed, L. Meyer, S. Sjarring, H. Sucher, B. Shirley, F. Thorndike, M. Christensen, E. Courtright, Wm. McGee, R. Torney, R. Graham, P. Pfarr, F. Cline, J. Gidley, G. Mank, A. Jasmin, P. Silva, M. Mulqueeney, S. Fuller, P. Olson, Wm. Morgan, F. Dixon, J. Hendershot, J. Wilbur, M. Dubin, S. Livingston and Wm. McMonagle.

introducing the provost of the University, he stated for himself and in behalf of the faculty the sincere approval of this inauguration of student management of the honor day program and, further, the hope for its continuance as a student affair.

The presentation of prizes was performed by H. Wallace Peters, provost of the University. Mr. Peters spoke briefly of the importance of the New York State Veterinary College as a unit of the University and expressed his pleasure as a participant of the evening. Prizes were awarded as follows:

THE ADDISON D. MERRY PRIZE

Given by A. E. Merry, '06, Syracuse, N. Y., for the best work in veterinary anatomy.

First Prize ($30): Claudio Muskus, '42.

Second Prize ($20): Benjamin Sann, '42.

Honorable Mention: Leon E. Blostein, '42.

THE JANE MILLER PRIZE

Given by Frank H. Miller, New York, for the best work in veterinary physiology.

First Prize ($25): Henry Polansky, '41.

Second Prize ($15): John W. Britton, '41.

Honorable Mention: Nathan Horwitz, '41.

THE CHARLES GROSS BONDY PRIZE

Given by Richard Bondy, New York, for the best work in the courses in practical medicine and surgery of small animals.

First Prize ($25): Bernard W. Rosen, '40.

Second Prize ($15): Mrs. C. C. Combs, '40.

Honorable Mention: Robert I. Ashman, '40; Harold Grotenstein, '40.

THE ANNA BESSE PRIZE

Given by Miss A. B. Jennings, New York, for the best work in medicine and clinical diagnosis ($40).

Carleton R. Kelsey, '40.

THE JAMES GORDON BENNETT PRIZE

Given by James Gordon Bennett of New York, for the students who show the greatest humaneness in handling animals, with special reference to the use of anesthetics ($40).

Garry V. McBride, '40.

Honorable Mention: Norman E. Skinner, '40.

THE HORACE K. WHITE PRIZE

Given by Horace K. White, and his sons, of Syracuse, for the students whose academic records for the entire veterinary course stand highest.

First Prize ($75): J. A. Baker, '40.

Second Prize ($25): Theodore Allen, '40.

Honorable Mention: Helen M. Borchmann, '40; Rebecca Gifford, '40; Norman E. Skinner, '40.

The address was given by Cassius Way of New York City. Students and faculty alike were highly conscious of the honor and pleasure of having Dr. Way present. As president of the American Veterinary Medical Association, a Cornellian, former faculty member, practitioner, and patron of the organization of the Cornell chapter, his presence was entirely fitting as the principal speaker of the evening.

E. W. TUCKER, *President.*

Iowa State College

A regular meeting of the Iowa chapter was called to order on the evening of April 24 by President Emerson, who introduced W. R. Anderson of Slater, Iowa. Dr. Anderson spoke on swine diseases and also discussed the ethics of veterinary practice.

Films in technicolor of jumping horses in California were shown by one of the members, and Sergeant-at-Arms Joe Graham gave a report on the conduct of the members at the meetings.

At the meeting of May 8, the Y.M.C.A. quartet sang several numbers. H. C. Smith of Fort Dodge, Iowa, spoke on veterinary practice and showed a series of lantern slides on canine and feline skin diseases due to fungus growths.

The treasurer reported that the veterinary banquet showed a net loss of $33.35, and the spring dance a profit of $25.30. Ed Taylor reported on the work being done by the education committee and Critic Jim Tate reported on the activities of some of the students.

WALTER TIMMS, *Secretary.*

Michigan State College

C. A. Cole of Saginaw, Mich., spoke on "Handling the Client" at a recent meeting of the Michigan chapter.

During the session Herbert C. Schneider was presented the annual faculty award for the best work in the freshman class, and Egbert S. Conklin was awarded a prize of $25, which is contributed annually by the Michigan state association, for the best work in the senior class.

All meetings have been well attended and excellent programs, arranged by Jim Steele, have been presented throughout the year.

The chapter has rejected the new constitution prepared by the executive office of the AVMA in favor of the one it now has in operation. The principal objection to the new document is its provision for two elections each year.

GAYLORD R. HARTSOUGH, *President.*

University of Pennsylvania

On April 17, the Pennsylvania chapter held its annual banquet at the Pennsylvania Athletic Club. Clyde I. Boyer acted as toastmaster.

Speakers of the evening were Raymond B. Church, M. A. Emmerson, J. G. Hardenbergh

U. S. GOVERNMENT

Veterinary Executive Position Available in Dominican Republic

The federal bureau of animal industry has been informed that the Dominican Republic desires to secure the services of an experienced veterinarian for the position of director of animal pathology in that country.

Duties of this position include the control and direction of importation and use of livestock remedies, serums, viruses, vaccines, etc., and direction of the campaigns to eradicate the cattle-fever tick and tuberculosis and Bang's disease of cattle.

Anyone interested in securing further information regarding this position may address the Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C., and the inquiries will be transmitted to the representative of the Dominican Republic.

Robert M. Chapin, Federal Biochemist, Dies

Robert Macfarlane Chapin, 62, chief of the biochemic division of the federal bureau of animal industry and well-known contributor to veterinary literature, died at the Johns Hopkins Hospital, Baltimore, Md., on May 6. Death followed a brief illness and a brain tumor.

Mr. Chapin was engaged in biochemical research relating largely to the development and standardization of disinfectants, livestock dips, and related products. He was associated for many years with M. Dorset, discoverer of anti-hog-cholera serum, whom he succeeded as chief of the biochemic division in 1935. Since that time, Mr. Chapin directed a wide range of research and service activities, including the preparation of tuberculin used in the nation-wide campaign to eradicate bovine tuberculosis, and also supervision of the stained antigen used extensively for the control of pullorum disease of poultry.

Army Rabies Report for 1939

During the calendar year 1939, 7,403 dogs, 296 cats, three monkeys and one fox, owned by army personnel received prophylactic treatment against rabies. This represents an increase of 1,083 vaccinations over 1938.

Of the vaccinated dogs, two developed rabies within the year following treatment. One case was reported from a station where vaccination is conducted every six months, and the other where the injections are administered annually. Thirteen cases of rabies were observed in unvaccinated dogs, the majority of which were strays impounded on military reservations. *(Army Veterinary Bulletin, xxiv, April 1940, pp. 159-160.)*

Sullys Hill National Game Preserve, North Dakota

The Sullys Hill National Game Preserve of North Dakota is administered by the federal bureau of biological survey to maintain exhibition herds of big-game animals where they may be viewed by the public. The preserve is open throughout the year, and although camping facilities have not been fully developed, a tract within the area has been fenced off for picnic purposes. Shelters, a rest house and playgrounds with equipment are available to visitors.

During the calendar year 1939, a total of 20,175 persons visited the preserve.

Memoirs of Eichhorn's Trip to Hawaii

"I am enclosing herewith a photograph taken during my recent visit to Hawaii which includes, I believe, every veterinarian of the Islands, together with the secretary of agriculture, Mr. F. H. Locey. During my visit I had the opportunity of obtaining data pertaining to the various activities on the Islands.

"The agricultural pursuits on the Islands are primarily concerned in the cultivation of cane sugar and pineapples. However, there are large areas on the foothills and slopes of the mountainous regions where the localities are suited for the maintenance of live stock. In some instances very large areas are controlled by individuals or groups maintaining many thousands of animals principally of the beef type, whereas around Honolulu large dairies are maintained for the production of milk.

"The Islands are not self-sufficient in their meat production and are obliged to import a considerable portion of their beef and pork supplies from the mainland. Slaughter of animals is carried out in a central abattoir provided with efficient federal veterinary inspection. Excellent attention, which compares favorably with the highest requirements prevailing in the United States, also is maintained in milk pro-

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(Continued from preceding page)

and Wm. H. Ivens. Following, an excellent program of professional entertainment was presented.

The annual banquet is given as a farewell to the graduating seniors and is one of the important social events of the year.

ELIZABETH J. COLLINS,
Recording Secretary.

Dr. and Mrs. Eichhorn Visit Hawaii

Back row (standing), left to right: W. M. Pang, L. A. Weight, W. F. Parker, L. A. Case, Lt. Col. C. F. Cox, L. N. Case, Paul Nomura, L. C. Moss, L. Bilikan, J. E. Bacus, and J. C. Fitzgerald. Middle row (seated), left to right: Mrs. K. Buffin, Mrs. J. D. Derrick, A. R. Glaisyer, Mrs. Paul Nomura, Miss D. Bastyr, Col. J. D. Derrick, Mrs. F. H. Locey, Miss B. Glaisyer, Mrs. A. Eichhorn, Mrs. R. H. Morrison, Mrs. L. Bilikan, Mrs. L. C. Moss, Mrs. L. E. Case, Mrs. C. F. Cox, and Geisha girl. Front row (seated), left to right: Music boys (shown at extreme left), R. H. Morrison, Lt. Col. K. Buffin, F. H. Locey, Geisha girl, A. Eichhorn, E. H. Willers and T. Katsunuma.

duction. This applies especially to the dairies located in the environment of Honolulu.

"The official veterinary activities are in charge of the territorial veterinary service, which includes, besides Dr. Ernest H. Willers, the territorial veterinarian, eight energetic and efficient assistants located in the various parts of the Islands, each having a territory assigned for the specific activities.

"The diseases prevalent on the Islands are substantially the same as those occurring on the mainland and losses from various infectious diseases are comparatively low, which may be attributed to the well-organized veterinary service as well as to the comparative sparsity of the animal population.

"The army and navy food inspection is in charge of the army veterinary officer and is augmented by the inspection service of the Bureau of Animal Industry, U. S. Department of Agriculture. The army veterinary service is in charge of Col. J. D. Derrick, who has creditably organized the food inspection for the army on the Islands.

"My visit to the Hawaiian Islands always will remain in my memory as one of my most interesting trips, and both Mrs. Eichhorn and I owe a debt of gratitude to the veterinarians and their families for the excellent reception they accorded to us."—*Adolph Eichhorn, director, Animal Disease Station, Beltsville, Md.*

Regular Army

Captain Benjamin F. Leach is relieved from assignment and duty at Carlisle Barracks, Pa., effective in time to proceed to New York, N. Y., and sail on transport scheduled to leave that port on or about June 18, 1940, for the Panama Canal department, and upon arrival will report to the commanding general for assignment to duty with the veterinary corps. Captain Leach has been on temporary duty at Camp Jackson, S. Car., since December 1939.

1st Lieut. James Durand Ramsey of the veterinary corps reserve is relieved from assignment and duty at Camp Jackson, S. Car., effective on or about April 5, 1940. At the proper time and upon completion of temporary duty in connection with army maneuvers at Camp Beauregard, La., he will proceed to MacDill Field, Fla., and report for duty.

Upon his return from foreign service in the Panama Canal department, Lt. Colonel Henry E. Hess is assigned to duty at Fort Devens, Mass.

Lt. Colonel Philip H. Riedel, having been found by an army retiring board to be incapacitated for active service on account of disability incident thereto, and such findings having been approved by the President, his retirement from active service on April 30, 1940, is announced. He is relieved from assignment and duty at Fort Sam Houston, Texas, on April 30, 1940, and at the proper time will proceed to his home.

Lt. Colonel Seth C. Dildine, Fort Lewis, Wash., is directed to report to the commanding officer, McChord Field, Wash., for duty as attending veterinarian, in addition to his other duties.

Lt. Colonel Jacob L. Hartman is relieved from duty at Fort Monroe, Va., and from additional duty as attending veterinarian, Nansemond Ordnance Depot, Portsmouth, Va., effective in time for him to proceed to New York, N. Y., and sail on transport scheduled to leave that port on or about July 23, 1940, for the Panama Canal department, for duty with the veterinary corps.

Captain Arvo T. Thompson is relieved from assignment and duty at the Army Medical Center, Washington, D. C., effective in time to proceed to New York, N. Y., and sail on transport scheduled to leave that port on or about June 29, 1940, for San Francisco, Calif., and upon arrival will proceed to March Field, Calif., and report for duty.

Major Laurence R. Bower is relieved from duty at March Field, Calif., effective in time for him to proceed to San Francisco, Calif., and sail on transport scheduled to leave that port on or about July 27, 1940, for New York, N. Y. Upon arrival in New York he will proceed to Washington, D. C., and report to the commanding general, Army Medical Center, for duty.

Veterinary Corps Reserve

NEW ACCEPTANCES—FIRST LIEUTENANTS

Ernest D. Barrows, 3406 S. 32nd Ave., Omaha, Neb.

Wayne Binns, 2nd West & 1st South, American Fork, Utah.

Arthur Lawrence Green, Route 3, Belding, Mich.

Lester Maxwell Greene, 85 S. Prospect St., Burlington, Vt.

Fred Melvin Harris, P. O. Box 163, Okanogan, Wash.

Jacob Joseph Schachter, 1935 Penn St., Harrisburg, Pa.

Wm. Jacob Schuck, Jr., 145 Trent Road, West Park Sta., Philadelphia, Pa.

PROMOTION—TO CAPTAIN

Theodore Henry Leenerts, 813 Elizabeth St., Valley City, N. Dak.

SEPARATION

1st Lieut. Frank Reed Winsor died March 2, 1940, at Montgomery, Ala. Cause: Gangrenous complications set in after one of his arms was mangled by a lion at the Oak Park zoo.

B.A.I. Transfers

Donald R. Appel from St. Louis, Mo., to Atlanta, Ga., on tuberculosis eradication.

John S. Bixby from Memphis, Tenn., to Boise, Idaho, on Bang's disease.

Norman G. Claus from Baltimore, Md., to Washington, D. C., on meat inspection.

William L. Davis from Baton Rouge, La., to Little Rock, Ark., on Bang's disease and hog cholera.

Edward M. Fitzgerald from Portland, Ore., to Memphis, Tenn., on meat inspection.

Francis A. Malloy from Pierre, S. Dak., to South St. Paul, Minn., on meat inspection.

Joseph F. Nieberding from Atlanta, Ga., to St. Louis, Mo., on meat inspection.

Eric H. Nordstrom from Storm Lake, Iowa, to Des Moines, Iowa, on Bang's disease.

Morris J. Weiner from Chicago, Ill., to New York, N. Y., on meat inspection.

Deaths.—Maurice R. Shale of Chicago, Ill., April 17, 1940; R. A. Givens of Reno, Nev., May 7, 1940.

AMONG THE STATES

Alabama

The national council of the fraternity Alpha Psi assembled for its biennial meeting at Auburn, March 22-23. Attended by all of the national officers and student representatives from every chapter, the meeting was regarded as the most successful in the history of the organization.

Delegates present were: Alpha, John Miller; Beta, Lew A. Wuori; Epsilon, George C. Pappensick; Zeta, Jack A. Bushnell; Theta, R. L. Williams; and Kappa, Philip C. Olson. The chapters at The Ohio State University and Cornell University each sent five additional members.

Due to the large attendance, College Centre Hall was provided for the meetings. During the course of the business proceedings many important fraternity matters were discussed, as well as questions concerned with the advancement of the profession in general.

National officers for the ensuing biennium are: R. E. Rebrassier (Ohio), president; F. X. Gassner (Colorado), 1st vice-president; W. S. Stone (Cornell), 2nd vice-president; E. T. Booth (Pennsylvania), secretary; and B. Scott Fritz (Pennsylvania), treasurer.

It was decided to hold the next meeting (1942) at Fort Collins, Colo.

Those who attended this meeting will long remember the hospitality shown by the chapter at Auburn to the delegates and visitors assembled from distant chapters.

A. HENRY CRAIGE, JR.

Arizona

April 17-18 the Arizona Veterinary Medical Association met in Tucson with the Arizona Public Health Association for its semiannual meeting, F. D. McMahon of Phoenix presiding.

Karl F. Meyer, director of the George Williams Hooper Foundation at San Francisco, Calif., spoke before the Arizona public health group in behalf of the Arizona VMA, and the entire assembly of more than 200 veterinarians and those associated with the public health service were present to hear his talk on "Diseases of Animals Transmissible to Man." Beyond a doubt, his presentation won many new friends for the veterinary service of this country.

Other speakers for the veterinary section were Myron Thom of Pasadena, Calif., who spoke on "Modern Small Animal Practice, Including X-Ray and Laboratory Procedure"; F. H. Maury, M.D., of Tucson, "Diseases of the Eye"; Frank Olvey of Phoenix, "Caudalmyotomy of Horses"; H. E. Kemper of Albuquerque, N. Mex., "Some Later Phases of Bang's Disease"; R. J. Hight of Tempe, "Encephalomyelitis in Horses"; and William Pistor of the University of Arizona, Tucson, "Display and Discussion of Poisonous Plants." In addition, several interesting and instructive films were presented by the Pitman-Moore Company and the federal bureau of animal industry.

J. B. MCQUOWN, *Resident Sec'y.*

Arkansas

The cattle population of Arkansas increased from 1,600,000 to 2,000,000 during the period 1935-1939.

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The Midsouth Practitioners' Association was formed in March at Hot Springs. Monthly meetings will be held at the locations of various members, where clinical experiences and local problems will be discussed. Rease Mitcham of Little Rock is president; Lee T. Railsback of Harrison, vice-president; and J. D. Morton of Pine Bluff, secretary-treasurer.

District of Columbia

The District of Columbia Veterinary Medical Association held its second quarterly meeting of the year at the Mayflower Hotel in Washington, on the evening of April 23, R. A. Kelser presiding.

W. G. Love, associate pathologist in the School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa., spoke on "Ophthalmology in the Use of the Ophthalmoscope," illustrating the various methods of procedure. A discussion of this subject by members of the army veterinary corps and others in the audience demonstrated the interest being shown in the subject at the present time.

A. Eichhorn, director of the Animal Disease Station at Beltsville, Md., spoke briefly about his trip to Hungary and Rumania on the typhus-vaccine mission. Dr. Eichhorn said that two kinds of vaccine were used—tissue culture and chick-embryo emulsion.

A large group of veterinarians and visitors from the surrounding territory brought the attendance close to 100. Refreshments were served at the conclusion of the meeting.

WM. M. MOHLER, *Resident Sec'y.*

Illinois

For several years Harry A. Paskind and Meyer Brown of the department of nervous and mental disease at the Northwestern University medical school, Chicago, have been

studying epilepsy in human patients. Now they are particularly interested in pursuing studies in animals which are subjected to repeated epileptiform seizures. It is hoped that such studies will extend the knowledge concerning the cause and treatment of epilepsy both in man and animals beyond its present narrow limits.

After a preliminary observation period of several months a number of therapeutic procedures in epileptic animals will be subjected to careful test. For example, the relation of dietary deficiencies to epileptiform manifestations or the efficacy of various modes of therapy can best be ascertained by carefully controlled observations in epileptic animals.

To these ends, Drs. Paskind and Brown are requesting members of the veterinary profession to communicate with them whenever they can make available for study a dog that has shown recurrent epileptiform manifestations. All responsibilities for the transport of such dogs will gladly be assumed by the department of nervous and mental disease at the Northwestern University medical school, located at 303 E. Chicago Ave., Chicago, Ill.

Indiana

William Leonard Axby, 23, only son of State Veterinarian J. L. Axby, and a young woman companion, Edna M. Spaulding, 21, were injured fatally on May 5 when young Axby's automobile sideswiped a stone bridge on a road 14 miles southeast of Indianapolis. The car overturned several times. The couple were returning to Indianapolis after a motor trip to Cincinnati, Ohio.

Funeral services were held on May 8.

Iowa

One hundred veterinarians attended a poultry clinic held at Fort Dodge on March 27. The interest in the proceedings was exceptionally keen and more than one half of the audience stayed until after 6:00 p. m., when the autopsies were completed.

Another poultry clinic, held at Milford on March 20, attracted an attendance of 150 producers and 35 veterinarians of northwest Iowa. This clinic was held in conjunction with the annual horse show, which has been an important event in that locale for several years.

Many local clinics have been held in Iowa this year, some of which have been for veterinarians only; most of them, however, have been for both veterinarians and producers. The poultry industry has recognized the failure of attempts to control poultry diseases without veterinary counsel and is now calling upon the veterinarians of Iowa to take over disease-control work.

Veterinarians who participated in the program of March 27 are Alvin Howard, John Wineinger, J. A. Barger, John S. Koen, C. D. Lee, E. A. Benbrook, Geo. B. Senior, I. J. Kleaveland and Paul V. Neuzil.

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State Veterinarian Seidell has issued an order requiring that all sheep sold through sales barns be dipped for scabies. Scabies is a growing menace of sheep raising, as is shown in the high incidence of the disease on small farms stocked with sheep purchased at community sales, several state veterinarians have declared.

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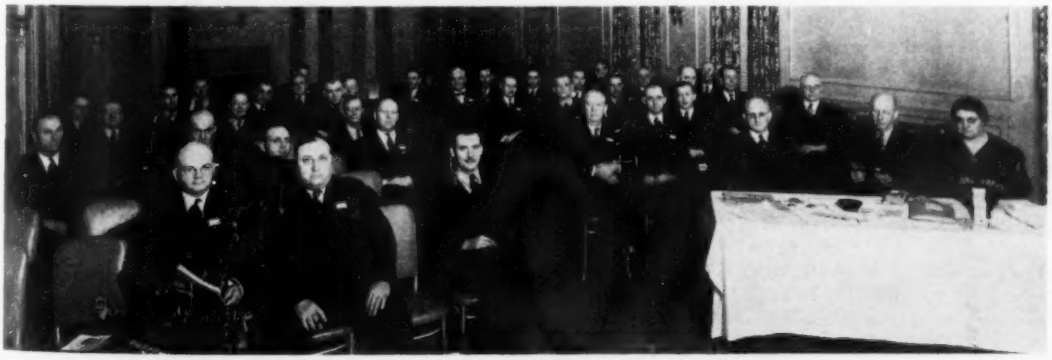
James H. Spence of Clinton and Edwin A. Buxton of Vinton were honored at a special recognition banquet in Cedar Rapids, May 2, given by the Eastern Iowa Veterinary Association, Inc., and the East Central Veterinary Medical Association. The occasion was the fiftieth anniversary, for both Drs. Spence and Buxton, of graduation from veterinary college. Dr. Spence was graduated by the Ontario



AMERICAN SOCIETY OF VETERINARY THERAPY

This is the group that attended the first meeting of the American Society of Veterinary Therapy, held at the President Hotel in Kansas City, Mo., March 14-15, 1940.

Veterinary College in 1890 and Dr. Buxton was graduated the same year by the Chicago Veterinary College.

Executive Secretary Merillat of the national association acted as toastmaster, and congratulatory messages were sent by Governor George Wilson and Mark Thornburg, Iowa secretary of agriculture.

Oklahoma

Community sales, according to Resident Secretary S. E. Douglas of Oklahoma City, are largely responsible for the spread of swine disease throughout the state, and he states further that there will be a heavy spring loss of cattle in Oklahoma because of the prolonged drouth and scarcity of feed.

Dr. Douglas adds that June graduates might well look to Oklahoma for a career in practice, since there are several county-seat towns where a substantial practice can be built.

Kansas

At the 17th annual Recognition Day program of Kansas State College at Manhattan, May 1, the following prizes were awarded to students in the Division of Veterinary Medicine:

HARWOOD PRIZE IN PHYSIOLOGY

$7.50, to Quentin E. Jeppesen, '42.

HARWOOD PRIZE IN ANATOMY

$7.50, to Donald K. Christian, '42.

ALUMNI PRIZES IN BACTERIOLOGY AND THERAPEUTICS

First prize, $10, to Bernard Busby, '41; second prize, $5, to Glover W. Laird, '41.

FRANKLIN PRIZES IN PATHOLOGY

First prize, $10, to Roger G. Spencer, '40; second prize, $5, to Mark L. Greenberg, '40.

BOWER PRIZES IN SMALL ANIMAL CLINICS

First prize, $10, to Carter H. Anthony, '40; second prize, $5, to Horton K. Howard, '40.

KANSAS VETERINARY MEDICAL ASSOCIATION PRIZES IN GENERAL PROFICIENCY

First prize, $15, to Orin E. Ellis, '40; second prize, $10, to Charles C. Moore, '40.

The contributors of the cash for these prizes are N. D. Harwood, '18; Benj. F. Pfister, '21; Earl F. Hoover, '24; O. M. Franklin, '12; Charles W. Bower, '18; and the Kansas Veterinary Medical Association.

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A group of 15 southeast Kansas veterinarians met at Cherryvale on April 15 and formed a local organization. The state association is sponsoring a movement to organize all graduate veterinarians of Kansas into local groups, and indications are that at least five groups such as that organized at Cherryvale will be formed.

L. L. Rush of Chanute was elected president of the southeast Kansas section, and Wm. D. Smith of Cherryvale is secretary. These officers will arrange the future programs.

R. F. COFFEY, *Resident Sec'y.*

Louisiana

E. P. Flower (U.S.C.V.S. '99) of Baton Rouge, state veterinarian and secretary of the Louisiana Livestock Sanitary Board, was honored by his fellow veterinarians at the recent state association meeting, during which he was presented with an enlarged portrait (tinted) of himself. J. Arthur Goodwin made the presentation on behalf of the association and pointed with pride to the fact that veterinarians have been considered gentlemen since Dr. Flower and the late W. H. Dalrymple and H. H. Vulliamy made their appearance in Louisiana.

E. P. Flower

The Louisiana Livestock Sanitary Board was organized on December 17, 1908, at which time Dr. Flower was appointed secretary and executive officer. He accepted the appointment and agreed to serve without compensation until funds were available to maintain the Board on an authoritative basis. The first appropriation for active work by the Board was granted by the legislature in 1910, after Dr. Flower had shown what was being accomplished in other states through the activities of livestock sanitary boards.

Dr. Flower's continuous service of over 31 years in the capacity of state veterinarian is probably the longest time that any man has held such an office. Eradication of the Texas fever tick and the practical eradication of sheep scab from western Louisiana, as well as many other worth while regulatory programs for the protection of live stock, have been carried out under the direction of, or with the coöperation of Dr. Flower. Rather than employ several deputies through his office, Dr. Flower deputizes practitioners to handle sudden outbreaks and to make special inspections.

Maine

The Maine Veterinary Medical Association met at the University of Maine, Orono, on April 24 for its quarterly meeting.

The large animal clinic, under the direction

of A. J. Neal of Bangor, included diagnosis and discussion of the treatment of an umbilical hernia about 3 in. in diameter in a heifer six months with calf. Among those who participated in the clinic were E. E. Russell of Farmington, President S. W. Stiles of Falmouth Foreside, and S. D. Merrill of South Paris.

E. C. Moore of Lewiston arranged the small animal clinic and ably demonstrated surgery on a large ranula in the ventral neck region of a dog. S. W. Stiles performed a stitchless spay operation on a cat, E. G. Sadler of Ellsworth discussed tonsillectomy in dogs, and S. D. Merrill demonstrated some of the newer methods in diagnosis and treatment of parasitic affections. Other interesting cases were discussed by Raymond Larcom of Kittery and G. M. Potter of Portland.

Mrs. A. J. Neal held a tea for the veterinarians' wives in Bangor during the afternoon. Dinner at the Log Cabin in Orono was followed by a business meeting, at which H. M. Tucker, chief of the state division of animal industry, discussed changes in the Bang's disease-control regulations for the state and ways of coöperating in this matter with state health agencies and the state livestock committee. Two of the most urgent problems appear to be the control of "bootleg" vaccines sold to laymen and the control of the spread of Bang's disease through practices of cattle dealers.

A social evening followed at the home of Dr. and Mrs. Witter in Orono.

J. F. WITTER, *Secretary.*

Minnesota

At the spring meeting of the Southwestern Minnesota Veterinary Medical Association, held at the City Hall in Lamberton, April 22, L. E. Stanton of Jackson was elected president; E. J. Kerr of Minnesota, vice-president; H. A. Knoche of Adrian, trustee; and Guy Van Duzee of Lamberton, secretary-treasurer.

JOHN N. CAMPBELL, *Resident Sec'y.*

Missouri

The recent organization of the Northeast Missouri Veterinary Medical Association marks the completion of the state association's sectional organization project. With active groups in northeast, northwest, southeast, southwest and central Missouri, and with associations at Kansas City, St. Joseph and St. Louis, officials of the state association believe that the veterinarians of Missouri are now thoroughly equipped to administer unified action to important problems.

New Mexico

Anna Canavan of Gallup, secretary of the McKinley County SPCA, writes: "Gallup does not have a veterinarian and needs one very much. We must now take our pets to Albuquerque, 160 miles away, for attention, and many people who would like to consult a veterinarian can not find time to make the trip.

"Gallup is a town of about 7,000. It is surrounded by mines which use mules, and a great number of sheep and cattle are raised in this territory. The dog population is also quite numerous.

"A veterinarian might not get rich here—few of us do, but we all break even. It ought to be worth a trial."

New York

A regular monthly meeting of the Veterinary Medical Association of New York City was held on the evening of April 3 at the Hotel New Yorker, New York City.

Guest Speaker Samuel A. Goldberg, former

SPENCE-BUXTON RECOGNITION BANQUET

Veterinarians of eastern and east central Iowa honored James H. Spence and Edwin A. Buxton at a special recognition banquet in Cedar Rapids, May 2. (See story on page 779.)

professor of pathology at Cornell University, now chief pathologist of the Presbyterian Hospital in Newark, N. J., spoke on "Certain Aspects of Kidney Lesions in Small Animals." Following this talk, many questions were asked by the members and a rising vote of thanks was extended to Dr. Goldberg for his excellent presentation.

A case report on "Leucemia in the Dog" was presented by E. A. Rogoff, and Charles J. Goubeaud spoke on "Some Observations on Intravenous Therapy."

J. J. MERENDA, *Secretary.*

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W. Reid Blair (McGill '02), 65, one of the country's outstanding authorities on animal pathology, retired as director of the New York Zoölogical Park effective May 1 after having been an official of the zoo for more than 38 years. He assumed the office of director in 1926, when he succeeded the late William T. Hornaday.

Dr. Blair will continue the wildlife conservation work in which he has been active for many years, and he will retain the secretaryship of the conservation committee of the New York Zoölogical Society, as well as the executive secretaryship of the American Committee for International Wildlife Protection.

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[*News of the untimely death of A. G. Hall reached the* JOURNAL *just in time for a short notice to be prepared for the May issue (page 694). In tribute to this prominent veterinarian of the East, President Way has kindly prepared the following brief of Dr. Hall's colorful career.*]

No event of recent years has cast such a deep shadow of sadness over members of the veterinary profession in New York state as has the untimely and tragic death of Arthur G. Hall. His life, which was filled with activity, was brought to an end by the wreck of the Lake Shore Limited on the New York Central railroad at Little Falls, April 19.

Dr. Hall was riding in one of the head coaches, and when the wreck occurred, shortly after 11:00 p. m., he was killed instantly. Thirty others met death and many more were injured seriously in this wreck, which was one of the worst in the history of American railroads. Missing an earlier train, he left New York on the ill-fated express for his home in Earlville, where he expected to spend the next day and then proceed to Rochester on the following day to attend a meeting of the Executive Board of the state society, of which he was president.

Dr. Hall was born 57 years ago in Verona, N. Y. After graduating from the Verona High School he worked his way through the New York State Veterinary College at Cornell University, and was graduated in 1908. After teaching for a time at the Agricultural College, St. Lawrence University, he began practice at Carthage, N. Y.

Joining the Borden Company in 1911, he was, for a number of years, manager of certified milk production, and was recognized nationally as an authority in this field of milk production. He was associate chief veterinarian of the Borden exhibit at the New York World's Fair last year.

Only a few weeks ago Dr. Hall was made vice-president and general manager of Borden's Guernsey Farms, Inc., a recently established subsidiary, and was making a marked success of the business.

In 1936 and 1937, he was president of the Metropolitan Certified Milk Producers Association. During the past 15 years he was an important member of the Board of Directors of the Certified Milk Producers Association of America.

In July 1939, he was elected president of the New York State Veterinary Medical Society, and his administration accomplished much for the organization. The membership is the largest in several years and the Society is instituting important projects, especially for the benefit of the practitioners of the state.

Dr. Hall joined the American Veterinary Medical Association in 1916 and always took much interest in its activities. In 1938, he was chairman of the large animal clinic committee at the Diamond Jubilee meeting in New York City. The demonstration clinic which he supervised in the ballroom of the Pennsylvania Hotel received nationwide publicity. Currently he was a member of the special Committee on Food Hygiene.

In addition to his duties with the Borden Company Dr. Hall owned and operated the Maple Avenue Farms near Earlville for 20 years, producing certified milk for the New York City market.

In 1911, he married Bertha C. Constine, who is the sole survivor of his family. A brother, Frank Hall, was killed in 1909, at the Verona crossing of the same railroad on which Dr. Hall met his death.

North Carolina

At present eight state men and two federal men are assigned exclusively to work on swine diseases. In connection therewith, it is planned to hold a swine clinic under the direction of Frank Breed of Lincoln, Neb., and Benjamin Schwartz of the federal bureau of animal industry at the annual meeting of the state association, June 27-28, in Rocky Mount. It is believed that a clinic of this kind will be of inestimable value to practicing veterinarians.

Ohio

The successful efforts of Cleveland veterinarians and those in suburbs about the city to clean up the local telephone directory has at-

tracted attention in veterinary circles throughout the country. At the time the drive to eliminate advertisements in the classified section was inaugurated, 20 veterinarians were subscribing to space ranging from three-line to 2½-in. box insertions. Only one veterinarian used the conventional "name of hospital and address" announcement.

As the direct result of coöperative effort, all advertisements excepting one financed by two veterinarians have been replaced by modest two-line listings.

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The 13th annual veterinary conference sponsored by The College of Veterinary Medicine, The Ohio State University, Columbus, to be held June 12-14, promises to be one of the most instructive programs in veterinary history. In addition to the college staff, 14 other outstanding speakers will address the three-day meeting. The program is well balanced and will appeal to all veterinarians, regardless of their individual interests. Another feature of the conference is a technical exhibit and demonstrations by the departments of anatomy, medicine, parasitology, pathology, physiology and pharmacology, preventive medicine, research, and surgery.

Copies of the program may be obtained by directing a request to Dean O. V. Brumley, The College of Veterinary Medicine, The Ohio State University, Columbus, Ohio.

Oregon

Chas. H. Seagraves of Oregon City, newly elected member of the Executive Board (AVMA) for District 7, writes: "May I express through the JOURNAL my appreciation in being elected to the Executive Board. I should like personally to convey, if this were possible, my gratitude to each member for this honor.

"I am mindful of being kindly favored in this vote and I do want to make the most of my office. It should be particularly stimulating to participate in the revitalized AVMA, which with its present policy of admitting new graduates to membership without the customary initiation fee should pave the way for great progress on its part."

Pennsylvania

The question concerning the superiority of pasteurized milk over raw milk, from the public health standpoint, was fulminated recently in Philadelphia.

Hubley Owens, director of public health for Philadelphia, has appointed a committee, composed of physicians and veterinarians, to investigate the matter and report to the city, with the object of possibly prohibiting the sale of raw milk within the city.

Although less than 1 per cent of the milk sold in Philadelphia (estimated daily sale of 800,000 qt. of pasteurized to 6,000 qt. of raw) is not pasteurized, much opposition has been voiced to this proposal.

Widespread attention was attracted by a paper presented before the Pennsylvania Association of Milk Dealers and Dairy Sanitarians at Harrisburg, April 17, on "The Significance of Milk Control in a Public Health Program," by Lt. Colonel A. Parker Hitchens, professor of public health and preventive medicine at the University of Pennsylvania. Col. Hitchens stressed the danger of disease transmission in milk, particularly Bang's disease, which he feels is not adequately controlled by existing methods of herd examination.

The Philadelphia Pediatrics Society has passed a resolution in favor of required pasteurization. On the other side, there are many, including veterinarians, physicians, herd owners and independent consumers, who insist that the evidence against raw milk is far from conclusive and they do not favor legal steps to prevent its sale.

Much discussion is going on, and probably will continue for several months, for it is doubtful if the committee will make a report to the city until late fall or winter.

A. HENRY CRAIGE, JR., *Resident Sec'y.*

South Carolina

Spring practice over the various sections of the state is about 20 per cent ahead of any previous year, in spite of the fact that the spring season has made its appearance the latest in 35 years. Hog cholera, hemorrhagic septicemia, blackleg and rabies, along with regular affections peculiar to the season, have kept practitioners "going every minute."

W. A. BARNETTE, *Resident Sec'y.*

Texas

A regular monthly meeting of the Dallas-Fort Worth Veterinary Medical Association was held on April 4 at the Texas Hotel in Fort Worth, with 50 veterinarians and their guests in attendance.

A. A. Lund of Armour and Company at Fort Worth spoke on "The Packer's View of Veterinary Inspection Under the B.A.I." State Senator Jess Martin of Fort Worth spoke on "Beliefs Contrary to Our Philosophy of Government," pointing out the tremendous amount of propaganda being disseminated in this country. M. B. Starnes of Dallas read a paper on "Veterinary Contributions to Human Health and Welfare." A movie on "Rickets in Calves" was shown by G. E. McIntosh of Arlington, and R. L. Rogers and G. R. Lowden of Fort Worth presented "Postmortem and Laboratory Observations of Coccidioidal Granuloma."

R. L. ROGERS, *Secretary.*

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The Houston Veterinary Association met on April 4 in Houston, with 19 members present.

W. T. Hufnall delivered the principal address of the evening, dealing with business aspects of veterinary medicine. As a result of his talk, a committee was appointed to draft a schedule of minimum fees for various veterinary services in the Houston area.

M. N. Bader, who is one of the directors of the newly formed American Society of Veterinary Therapy, gave a brief résumé of the aims and purposes of the organization. The majority of the practitioners in the Houston association pledged support to the Society.

JOHN TOM KIRBY, *Secretary.*

Washington

Coincidental with the elimination of Bang's disease in certain milk sheds, the volume of production has risen although the number of cows has decreased.—*Bulletin, Washington State Veterinary Medical Association, January 1940.*

Wyoming

The laboratory of the Wyoming state board of health recently reported four human cases of undulant fever at Gillette. As a result, the dairymen of that vicinity have requested that their cattle be tested for Bang's disease under the state-federal coöperative program. As of May 6, twelve herds have been tested, none of which contained reactors.

COMING MEETINGS

Chicago Veterinary Medical Association (annual banquet). Hotel Sherman, Chicago, Ill. June 4, 1940. G. S. Elwood, secretary, 5449 Broadway, Chicago, Ill.

Small Animal Hospital Association. Los Angeles, Calif. June 4, 1940. W. K. Riddell, secretary, 3233 W. Florence Ave., Los Angeles, Calif.

New York City, Veterinary Medical Association of. Hotel New Yorker, New York, N. Y. June 5, 1940. J. J. Merenda, secretary, 135 W. 53rd St., New York, N. Y.

Dallas-Fort Worth Veterinary Medical Society. Dallas, Texas. June 6, 1940. R. L. Rogers, Jr., secretary, Route 2, Gordon, Texas.

Houston Veterinary Association. Houston, Texas. June 6, 1940. W. T. Hufnall, secretary, 1612-14 E. Alabama Ave., Houston, Texas.

Mississippi Valley Veterinary Medical Association, Inc. Abingdon, Ill. June 6, 1940. L. A. Gray, secretary, Bushnell, Ill.

St. Louis District Veterinary Medical Association. Melbourne Hotel, St. Louis, Mo. June 7, 1940. J. P. Torrey, secretary, 610 Veronica Ave., East St. Louis, Ill.

Texas, State Veterinary Medical Association of. Texas A & M College, College Station, Texas. June 11-12, 1940. M. B. Starnes, corresponding secretary, City Health Dept., Dallas, Texas.

Ohio State University Veterinary Conference. Ohio State University, Columbus, Ohio. June 12-14, 1940. O. V. Brumley, dean, College of Veterinary Medicine, Ohio State University.

Maryland State Veterinary Medical Association. Baltimore Hotel, Baltimore, Md. June 13, 1940. Mark Welsh, secretary, College Park, Md.

Kansas City Veterinary Medical Association. Kansas City, Mo. June 17, 1940. S. J. Schilling, secretary, Box 167, Kansas City, Mo.

San Diego County Veterinary Medical Association. Zoölogical Research Bldg., Balboa Park, San Diego, Calif. June 17, 1940. Paul D. DeLay, secretary, State Poultry Pathological Laboratory, Balboa Park, San Diego, Calif.

Oklahoma Veterinary Medical Association. Oklahoma A & M College, Stillwater, Okla. June 17-18, 1940. F. Y. S. Moore, secretary, McAlester, Okla.

American Association for the Advancement of Science. Seattle, Wash. June 17-22, 1940. F. R. Moulton, secretary, Smithsonian Institution Bldg., Washington, D. C. (AVMA representative: Ward Giltner, Box 955, East Lansing, Mich.)

Eastern Iowa Veterinary Association, Inc. Tenth Annual Practitioners' Clinic. Dairy Cattle Congress Grounds, Waterloo, Iowa. June 18, 1940. H. E. Tyner, secretary, New London, Iowa.

Southern California Veterinary Medical Association. Chamber of Commerce Bldg., Los Angeles, Calif. June 19, 1940. Charles Eastman, secretary, 725 S. Vancouver Ave., Los Angeles, Calif.

Idaho Veterinary Medical Association. Buhl, Idaho. June 24-25, 1940. E. M. Gildow, secretary, Carnation Milk Farms, Carnation, Wash.

Wyoming Veterinary Medical Association. Cheyenne, Wyo. June 24-25, 1940. H. D. Port, secretary, 304 Capitol Bldg., Cheyenne, Wyo.

California State Veterinary Medical Association. City Auditorium, San Jose, Calif. June 24-26, 1940. Chas. J. Parshall, secretary, 319 B St., Petaluma, Calif.

South Carolina Association of Veterinarians. Greenville, S. Car. June 25-26, 1940. R. A. Mays, secretary, 415 State Office Bldg., Columbia, S. Car.

Massachusetts Veterinary Association. Hotel Westminster, Copley Square, Boston, Mass. June 26, 1940. H. W. Jakeman, secretary, 44 Bromfield St., Boston, Mass.

North Carolina State Veterinary Medical Association. Rocky Mount, N. Car. June 27-28, 1940. J. H. Brown, secretary, Tarboro, N. Car.

Montana Veterinary Medical Association. Bozeman, Mont. June 28-29, 1940. (To be held in joint session with the western division of the American Society of Animal Production.) E. A. Tunnicliff, secretary, Montana Agricultural Experiment Station, Bozeman, Mont.

Missouri Veterinary Medical Association. Elms Hotel, Excelsior Springs, Mo. July 1-2, 1940. J. L. Wells, secretary, 1817 Holmes St., Kansas City, Mo.

Ontario Veterinary College Short Course for Veterinarians and Ontario Veterinary Association. Ontario Veterinary College, Guelph, Ont. July 9-11, 1940. W. J. Rumney, secretary, 612 King St., W., Hamilton, Ont.

Kentucky Veterinary Medical Association. Brown Hotel, Louisville, Ky. July 10-11, 1940. F. H. Riester, secretary, Buechel, Ky.

New Jersey, The Veterinary Medical Association of. Hotel Claridge, Atlantic City, N. J. July 11-12, 1940. J. G. Hardenbergh, secretary, c/o Walker-Gordon Laboratory Co., Plainsboro, N. J.

Georgia State Veterinary Association. Moultrie, Ga. July 17-18, 1940. J. E. Severin, secretary, 357 Edgewood Ave. S. E., Atlanta, Ga.

New York State Veterinary Medical Society. Hotel Seneca, Rochester, N. Y. July 18-20, 1940. F. F. Fehr, secretary, 243 S. Elmwood Ave., Buffalo, N. Y.

Collège des Médecins Vétérinaires de la Province de Quebec (College of Veterinary Surgeons of the Province of Quebec), annual convention. Montreal, Que. July 19-20, 1940. G. T. Labelle, secretary, 5053, Christophe-Colomb, Montreal, Que.

American Veterinary Medical Association. Mayflower Hotel, Washington, D. C. August 26-30, 1940. L. A. Merillat, secretary, 221 N. La Salle St., Chicago, Ill.

Attention, Secretaries of Component Associations

To insure listing of coming meetings of your state or local association, information should reach the JOURNAL on or before the 15th of the month preceding the month of issue.

State Board Examinations

Iowa Veterinary Medical Examining Board. June 11-12, 1940. All applicants must be in the office of the Division of Animal Industry not later than 8:00 a.m., June 11. Further information may be obtained from H. A. Seidell, chief, Division of Animal Industry, State Capitol, Des Moines, Iowa.

Missouri State Board of Veterinary Examiners. Jefferson City, Mo. June 17-18, 1940. All candidates for the examination should register their names promptly with the secretary, H. E. Curry, P. O. Box 630, Jefferson City, Mo.

Nebraska Board of Veterinary Examiners. June 17-18, 1940. All applications must be filed at least 15 days prior to the first day of examination. Further information may be obtained from Mrs. Clark Perkins, director, Bureau of Examining Boards, State Capitol Bldg., Lincoln, Neb.

Oklahoma Board of Veterinary Medical Examiners. State Capitol Bldg., Oklahoma City, Okla. July 1-2, 1940. Further information may be obtained from W. C. McConnell, secretary, Holdenville, Okla.

Connecticut Board of Veterinary Registration and Examination. State Office Bldg., Hartford, Conn. July 2, 1940. Further information may be obtained from Geo. E. Corwin, secretary, State Office Bldg., Hartford, Conn.

Maine State Board of Veterinary Examiners. July 8, 1940. Further information may be obtained from the secretary, S. W. Stiles, Falmouth Foreside, Me.

Indiana Veterinary Examining Board. Room 209 State House, Indianapolis, Ind. July 9, 1940. All applicants must be in the office of the state veterinarian by 8:00 a. m. of said day. Application blanks may be secured from J. L. Axby, secretary, Room 209 State House, Indianapolis, Ind.

Utah Veterinary Medical Examining Board. Room 302, State Capitol Bldg., Salt Lake City, Utah. July 15-16, 1940. Applications may be obtained from the secretary at the above address. Applications must be accompanied by $15, to cover fee.

Illinois State Board of Veterinary Examiners. Chicago, Ill. July 29-30, 1940. Applicants will secure blanks and instruction as to fee, qualification, hours and address of examination room from the Superintendent of Registration, Department of Registration and Education, Springfield, Ill. The examining board consists of W. W. Warnock, Aledo; W. H. Shaw, Paw Paw; and L. A. Merillat, chairman, Chicago.

PERSONAL NOTES

Births

To Louis J. (O.S.U. '37) and Ernestine (O.S.U. '37) Payen of Redding, Calif., a son, Louis Arthur, January 30, 1940.

To Dr. (A.P.I. '34) and Mrs. Bill Dorrough of Leeds, Ala., a son, Billey A., March 17, 1940.

To Dr. (A.P.I. '22) and Mrs. E. A. Davis of Columbus, Ga., a daughter, Jane Alice, April 16, 1940.

Activities

J. B. Hollingsworth (Mc.G. '98) will go on superannuation on July 1, 1940, after having served as inspector of foods at Ottawa, Ont., for 33 years.

H. H. Anderson (Ont. '22), a member of the staff of the Dominion health of animals branch, Winnipeg, Man., since 1929, has been promoted to the position of senior veterinary inspector, grade 2.

I. F. Huddleson (Mich. '25) of Michigan State College, East Lansing, Mich., will be honorary president of the second annual Mexican Congress for Malta Fever Study to be held in Guadalajara, Mexico, during the first week of June.

Norman D. Christie (Ont. '10), a member of the staff of the Dominion health of animals branch since 1910, has been promoted to the position of district veterinary inspector for the Province of Saskatchewan, with headquarters at Regina.

J. N. Campbell (Ont. '15) of Truman, Minn., addressed the Minnesota Swine Breeders Association when it met recently at University Farm, St. Paul, Minn., in connection with the annual Farm and Home Week conducted by the University of Minnesota.

Theodore H. Leenerts (Colo. '31) has been appointed to the staff of the Nevada division of animal industry and will act as district veterinarian for the northeastern section of the state, with headquarters at Elko. He fills the vacancy caused by the death of F. E. Henderson.

DEATHS

Chauncey E. Sawyer, 48, of Puyallup, Wash., head of the veterinary department of the Western Washington Experiment Station, State College of Washington, died on April 26, 1940.

Born at Iola, Kan., September 21, 1891, Dr. Sawyer attended Kansas State College until 1917, when he served as captain in the field artillery brigade of the 42nd division. After spending 18 months in France and Germany, he reëntered Kansas State College, from which he was graduated in 1921. At that institution he served as assistant professor of pathology until joining the staff of the State College of Washington in 1925.

Although Dr. Sawyer devoted himself principally to poultry-disease research, he also was an enthusiastic leader in the general field of veterinary medicine. In 1938, he served as president of the Washington State Veterinary Medical Association and was secretary of that organization at the time of his death.

Dr. Sawyer joined the AVMA in 1921.

C. M. H.

Bernard A. Gallagher, 59, of Honolulu, Hawaii, died following an operation for a brain tumor on February 4, 1940.

Born in Ithaca, N. Y., October 29, 1880, he was graduated from Cornell University in 1901. Following, he entered the service of the federal bureau of animal industry at Washington, D. C., and in 1925 was sent to Honolulu as bacteriologist in charge of forestry and animal industry to organize and equip a laboratory.

Dr. Gallagher is the author of two books on poultry diseases, one of which is now being used as a textbook at Cornell University. During the World War he held the rank of lieutenant in the veterinary corps and he was in the reserve corps after the war.

Dr. Gallagher joined the national association in 1913.

E. E. Tobin, 48, of Greeley, Colo., died at his home on March 30, 1940, after a long illness.

Born at Montrose, Colo., December 19, 1891, Dr. Tobin was graduated from Colorado State College in 1913. He had been engaged in practice at Greeley since 1917, and at the time of his death he was president of the state veterinary examining board.

Dr. Tobin joined the national association in 1920.

George Francis Campbell, 62, foreman of the surface printing division of the federal bureau of engraving and printing, died recently, after a long illness, at his home in Arlington, Va.

A native of Jacksonville, Ill., and a graduate of the United States College of Veterinary Surgeons, class of '10, Dr. Campbell served as a first lieutenant in the veterinary corps during the World War, with station at Camp Meade, Md. He was a member of the Association from 1918-1922.

RABIES CONTROL

EVERY SCIENTIFIC BODY IN THE WORLD WHICH HAS MADE A CAREFUL STUDY OF RABIES CONTROL HAS RECOMMENDED VACCINATION OF DOGS COMBINED WITH APPROPRIATE SANITARY MEASURES AS BEING THE BEST MEANS OF CONTROLLING THIS DISEASE IN AREAS WHERE INFECTION IS KNOWN TO EXIST.

The vast amount of clinical data accumulated through two decades, in which many million dogs have received rabies vaccine as a prophylactic agent, shows beyond any doubt that rabies vaccine is effective in controlling rabies. The few highly publicised reports of experiments under laboratory conditions in which adverse results are recorded merely serve to emphasize the failure of the reporters to devise tests that may be expected to correlate the results following the use of this vaccine under laboratory and field conditions.

THE THING OF IMPORTANCE TO HUMAN AND ANIMAL WELFARE IS THE FACT THAT CLINICAL EXPERIENCE HAS SHOWN THAT RABIES VACCINE DOES PROTECT A HIGH PERCENTAGE OF DOGS AGAINST FIELD (OR NATURAL) EXPOSURE TO RABIES.

THE RECORD MADE BY RABIES VACCINE (LOCKHART) IS OUTSTANDING. We believe this to be due to the care in selecting virus-bearing tissue, and to the method of processing we have developed.

Regular tags and certificates are supplied with each dose of vaccine. Special tags bearing the veterinarian's name are supplied at reasonable additional cost.

ASHE LOCKHART, INC.

"Producers of Better Biologicals for Graduate Veterinarians."

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Sequence in production of Jen-Sal Equine Encephalomyelitis Vaccine (Chick)

(1) Newly constructed laboratory building exclusively devoted to production of Encephalomyelitis Vaccine (Chick).

(2) Inoculating eggs. A small opening is drilled in the egg which is then placed on the turnstile conveyor which carries it to an adjoining room where the virus is inoculated into the embryonic tissue. Opening is then sealed with wax.

(3) Grinding, filtering, cooling, diluting, colloidizing and formalizing are preparation processes of prime importance. Note type of protecting appliances and clothing worn by the operator.

(4) Guinea pigs have a controlling role as these test animals give evidence of vaccine potency, virus concentration, etc. Note spots on cranium indicating location of subdural virus inoculation of test pigs.

(5) Filling the tested and approved product in final containers.

(6) Drilling eggs for virus inoculation and arranging trays for subsequent incubation.

(7) The embryo suspended between the scissors blades has just been aseptically removed from the incubated egg and is about to be deposited in the jar for final processing.

JENSEN-SALSBERY LABORATORIES, INC.
KANSAS CITY, MO.

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